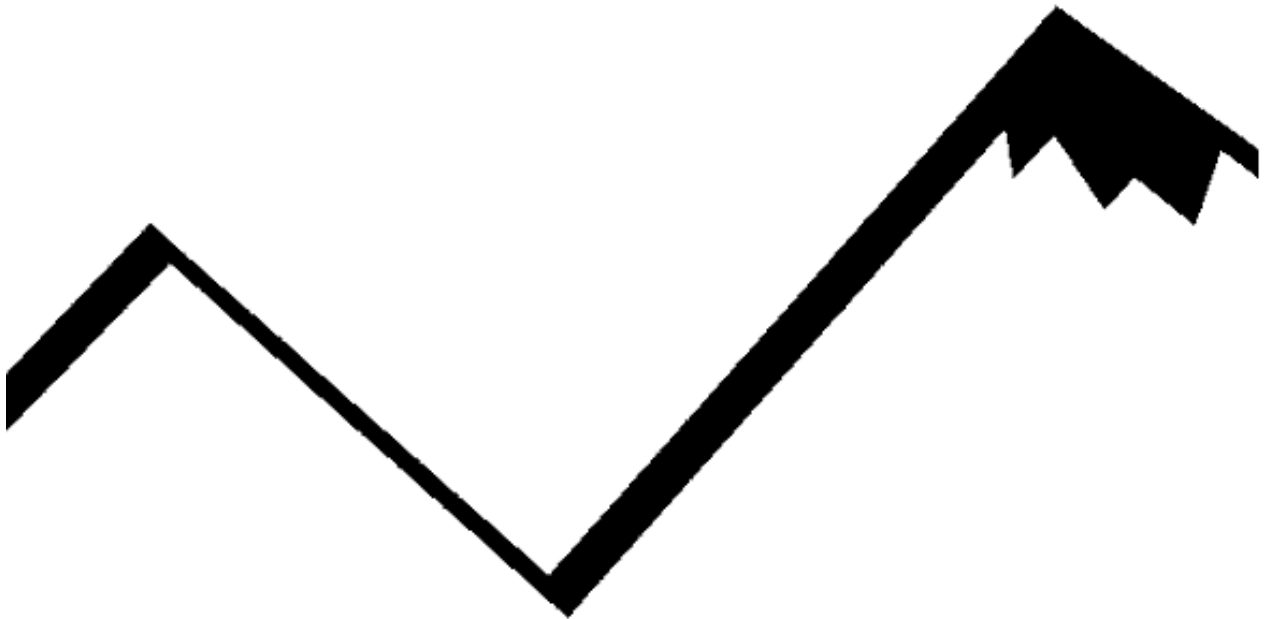


**San Joaquin Valley  
Air Pollution  
Control District**



***2009 RACT SIP***

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**Reasonably Available Control Technology (RACT)  
Demonstration for Ozone State Implementation Plans (SIP)**

**April 16, 2009**

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## **Chapter 1**

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### **Overview**

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## **Chapter 1: Overview**

### **1.1 INTRODUCTION**

The San Joaquin Valley Air Basin (SJVAB) is an inter-mountain valley comprised of eight counties in California's San Joaquin Valley: Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare, and the Valley portion of Kern. The SJVAB is approximately 250 miles long, averages 80 miles wide, and is partially enclosed by the Coast Range on the west, the Tehachapi Mountains on the south, and the Sierra Nevada on the east. These surrounding mountains trap pollution. The region's low wind speeds, combined with low-level temperature inversions in the winter, are conducive to trapping particulates, and the region's hot, sunny, and dry summers are conducive to ozone formation. Due to the topography and meteorological conditions, the SJVAB faces air quality challenges unmatched by any other air basin.

The SJVAB is currently designated as nonattainment for the PM<sub>2.5</sub> (Particulate Matter 2.5 microns or less in diameter) National Ambient Air Quality Standard (NAAQS) and extreme nonattainment for the eight-hour ozone NAAQS. Prior to the United States Environmental Protection Agency's (EPA's) implementation of the eight-hour ozone standard, the SJVAB was also classified as an extreme nonattainment area for the one-hour ozone NAAQS. Although EPA revoked the one-hour ozone NAAQS, the San Joaquin Valley Air Pollution Control District (District) is still required to meet certain related requirements mandated by the federal Clean Air Act. In addition to being designated as nonattainment of federal air standards, SJVAB is designated as nonattainment for the California ozone air quality standards and nonattainment for the California PM<sub>10</sub> and PM<sub>2.5</sub> air quality standards.

Since its formation in 1992, the San Joaquin Valley Unified Air Pollution Control District (District) has adopted about 500 rules and rule amendments. The District was the nation's first air district to adopt a progressive Indirect Source Review (ISR) program, and was the first air district to adopt rules to control emissions of volatile organic compound (VOC) from wine production and storage operations and residential fireplaces. In addition, the District leads the nation with its stringent oxides of nitrogen (NO<sub>x</sub>) emission limits on engines, boilers, turbines, and glass-melting furnaces.

Air quality improvements evidence the success of the District's innovative and effective rules. Significant progress has been made towards the attainment of the ozone and PM<sub>2.5</sub> NAAQS and the EPA has redesignated the SJVAB from nonattainment to attainment for the PM<sub>10</sub> NAAQS.

## 1.2 REASON FOR THIS PROJECT

Despite the progress towards attainment, the SJVAB remains in nonattainment for ozone and Sections 182(b)(2) and 182(f) of the federal Clean Air Act require ozone nonattainment areas to implement RACT for sources that are subject to Control Techniques Guidelines (CTG) documents issued by EPA and for “major sources” of volatile organic compounds (VOCs) and oxides of nitrogen (NO<sub>x</sub>), which are ozone precursors. RACT requirements are included in the Clean Air Act to assure that significant source categories at major sources in the nation’s nonattainment areas are controlled to a “reasonable” extent.

This document demonstrates that all federal RACT requirements have been satisfied in the SJVAB.

### 1.2.1 One-hour Ozone Requirements

In June of 2004, United States Environmental Protection Agency (EPA) designated San Joaquin Valley Air Basin as nonattainment for the new 8-hour ambient air quality standard for ozone. Subsequently, in June of 2005, EPA revoked the previous 1-hour ambient air quality standard. However, prior to EPA's revocation of the 1-hour ozone standard, in October 2004, the District had submitted an Extreme Ozone Attainment Demonstration Plan (EOADP) for the 1-hour ozone standard. Within the EOADP, was a RACT discussion (Section 4.2.5) which satisfied all the requirements that EPA had specified at the time.

In November 2005, EPA changed its policy for RACT in SIPs, as outlined in their Final Rule to Implement the 8-hr Ozone National Ambient Air Quality Standard-Phase 2 (70 FR 71612). In 2008, EPA notified the District that the 2004 EOADP RACT discussion did not meet the requirements of the new policy. District staff, in discussions with EPA staff, determined that the most prudent course of action to address this discrepancy was to formally withdraw the RACT discussion from the 2004 EOADP, thereby removing it from EPA's review and approval process for the 1-hr ozone SIP requirements.

Therefore, on August 21, 2008, the District's Governing Board approved agenda item [“Adopt the Clarifications and Documentation Regarding the 2004 Extreme Ozone Attainment Demonstration Plan for the Revoked Federal 1-Hour Ozone Standard”](#), which provided EPA with the necessary documentation and clarification needed to take final action on the 2004 1-hour ozone plan. Contained within this Governing Board item was the withdrawal of the RACT portion of that plan (Section 4.2.5) and a commitment to replace it with a new RACT analysis.

Then on January 21, 2009, EPA published in the Federal Register a [“Finding of Failure to Submit a Required State Implementation Plan Revision for 1-Hour Ozone Standard, California--San Joaquin Valley – Reasonably Available Control Technology”](#). This action triggered sanction "clocks" under the Clean Air Act. The first sanction clock runs for 18 months and, if not stopped, imposes a 2:1 ratio on offsets for new major

stationary sources. The second sanction runs for 24-months and, if not stopped, would restrict the use of federal highway funds in the area, with the exception of certain safety and air quality projects. The District can avoid sanctions by submitting a completed RACT plan that meets the federal expectations.

This RACT demonstration report will satisfy the commitment for a new RACT analysis for the 1-hour ozone plan and prevent all sanctions that could be imposed by the “finding of failure to submit”.

### 1.2.2 Eight-hour Ozone Requirements

According to the EPA’s *Final Rule to Implement the Eight-Hour Ozone NAAQS* (70 FR 71612, November 29, 2005), areas classified as moderate nonattainment or higher must submit a demonstration that their current rules fulfill eight-hour ozone RACT for all CTG categories and all major, non-CTG sources. This demonstration would be a revision to their State Implementation Plan (SIP). States can demonstrate that RACT is being fulfilled with either a new RACT determination or a certification that previously required RACT controls also represent RACT for eight-hour ozone. Areas may rely on previous analyses written for one-hour ozone plans and EPA guidance documents.

On August 17, 2006 the District Governing Board adopted a RACT SIP analysis for its eight-hour ozone serious nonattainment classification. Per Section 182 (c) of the federal Clean Air Act, areas classified as serious nonattainment have a 50 tons per year (tpy) major source definition. The Valley did not, however, experience a 50 tpy threshold because of state law and the federal revocation of the 1-hour ozone standard.<sup>1</sup> The August 2006 RACT SIP analysis showed that the District’s rules met or exceeded RACT requirements for all applicable EPA source categories. The final eight-hour ozone attainment plan (*2007 Ozone Plan*), adopted on April 30, 2007, requested an extreme nonattainment classification for the District. For areas classified as extreme nonattainment, the major source definition is 10 tpy VOC or NO<sub>x</sub> (Section 182 (e) of the federal Clean Air Act).

To assess the District’s rules based on the adjusted major source definition of 10 tpy, on December 28, 2007 the District published a revised RACT SIP analysis for public comment. The analysis also evaluated District rules against four new CTGs promulgated between August 2006 and December 2007 and reviewed additional rules and rule amendments for RACT that were adopted by the District’s Governing Board between August 17, 2006 and December 2007. The District received comment letters from EPA and Earthjustice which suggested that the District conduct a more thorough analysis for each rule to address RACT and evaluate how emission limits found reasonable in other areas have changed since EPA approval of the District’s rules.

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<sup>1</sup> Section 42504 of the California Health and Safety Code stipulates that any major source threshold in effect as of December 30, 2002 cannot be relaxed to a higher threshold. On December 30, 2002 the Valley was classified as severe nonattainment for 1-hour ozone, so the threshold remained at 25 tpy. This state law prevented the Valley’s major source threshold from rising to 50 tpy upon classifying the Valley as serious nonattainment for 8-hour ozone.

This RACT demonstration report therefore, replaces both the original August 17, 2006 RACT SIP analysis and the December 28, 2007 revised RACT SIP analysis as it assesses the District's rules based on the adjusted major source definition of 10 tpy, evaluates District rules against new CTGs promulgated since August 2006, and also reviews additional rules and rule amendments for RACT that have been adopted by the District's Governing Board since August 17, 2006.

### 1.2.3 Additional Requirements

As part of the August 2006 RACT SIP analysis, District staff identified eight rules<sup>2</sup> that were not previously submitted to EPA for inclusion into the SIP. In May 2007, District staff submitted the rules to the California Air Resources Board (ARB) for transmittal to EPA for inclusion into the SIP. On January 2, 2008, EPA published in the Federal Register (73 FR 48) a direct final approval of the rules into the SIP. The direct final action was published without prior proposal because EPA anticipated no adverse comment. The direct final rule stated that if adverse comments were received by February 1, 2008, EPA would publish a timely removal in the Federal Register. EPA received a timely adverse comment which suggested that the rules did not meet the federal Clean Air Act, Section 172(c)(1) requirements for RACT and consequently removed the direct final approval of the rules. It should be noted that the EPA did not determine that these rules do not satisfy RACT.

This RACT demonstration report also addresses EPA's request for additional information regarding the eight rules proposed for direct final approval

## 1.3 EIGHT-HOUR OZONE RACT DEMONSTRATION ELEMENTS

A letter from EPA, Region IX outlined a possible RACT SIP submittal strategy. The strategy included five main points:

- A description of efforts to identify all source categories within the District requiring RACT, including CTG sources (i.e., covered by an EPA Control Technique Guideline document) and major non-CTG sources.
- A submission of negative declarations where there are no facilities (major or minor) within the District subject to a CTG.
- A list of the state/local regulation that implements RACT for all categories needing RACT, including the date EPA approved these regulations as fulfilling RACT.

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<sup>2</sup> Rule 4104 (Reduction of Animal Matter); Rule 4402 (Crude Oil Production Sumps); Rule 4404 (Heavy Oil Test Station – Kern County); Rule 4453 (Refinery Vacuum Producing Devices or Systems); Rule 4454 (Refinery Process Unit Turnaround); Rule 4625 (Wastewater Separators); Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations); and Rule 4672 (Petroleum Solvent Dry Cleaning Operations)

- A description of the basis for concluding that the regulations fulfill RACT. Documents useful in establishing RACT include CTGs, Alternative Control Technique guidelines (ACT), Maximum Achievable Control Technology (MACT) standards, New Source Performance Standards (NSPS), California Suggested Control Measures (SCM) and RACT/Best Available Retrofit Control Technology (BARCT) determinations, regulations adopted in other Districts, and guidance and rules developed by other state and local agencies.
- If a district uses CAPCOA's September 2003 *Potential All Feasible Measures (AFM) Report* to help demonstrate RACT, the RACT SIP should certify that local regulations are equivalent to AFM, justify the assumption that the AFM fulfilled RACT in 2003, and include some sort of certification/demonstration that no additional controls have become more reasonably available since then.

Pursuant to EPA's guidance, this RACT Demonstration report is composed of several main elements:

- A demonstration that EPA's CTGs are being implemented appropriately in the SJVAB, and a discussion of two CTG categories that do not exist in the SJVAB. (See Chapter 2)
- A demonstration that all major sources in the SJVAB are covered by RACT rules. (See Chapter 3)
- A demonstration that the District's rules for ozone precursors (NO<sub>x</sub> and VOC) satisfy RACT levels of stringency, applicability, and enforceability. (See Chapter 4)

## 1.4 PROCESS FOR DEVELOPING THIS RACT DEMONSTRATION SIP

### 1.4.1 Review Of Federal RACT Requirements

#### 1.4.1.1 Federal Applicability of RACT

The Clean Air Act (CAA) Section 182(b)(2) states that ozone attainment plans shall assure that RACT for volatile organic compounds (VOC) is applied at certain sources.

“The State shall submit a revision to the applicable implementation plan to include provisions to require the implementation of reasonably available control technology under section 172(c)(1) of this title with respect to each of the following:

(A) Each category of VOC sources in the area covered by a CTG document issued by the Administrator between November 15, 1990, and the date of attainment.

(B) All VOC sources in the area covered by any CTG issued before November 15, 1990.

(C) All other major stationary sources of VOCs that are located in the area.”

Section 182(f) extends federal RACT requirements to NOx rules and major NOx sources. Because the San Joaquin Valley Air Basin is classified as an extreme ozone area, “major sources” are those that generate more than 10 tons per year of NOx or VOC.

#### **1.4.1.2 Definition and Stringency of RACT**

Although the Clean Air Act itself does not define Reasonably Available Control Technology, 40 CFR 51.100(o) defines RACT as:

”devices, systems, process modifications, or other apparatus or techniques that are reasonably available, taking into account (1) the necessity of imposing such controls in order to attain and maintain a national ambient air quality standard; (2) the social, environmental, and economic impact of such controls; and (3) alternative means of providing for attainment and maintenance of such a standard.”

The foregoing definition applies to a specific federal provision regarding approval of extension requests for attainment plans for secondary air quality standards, but in the absence of a more definitive regulatory description, it is concise and useful. EPA also defined RACT in the Strelow memorandum<sup>3</sup> as:

“the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available, considering technological and economic feasibility”.

#### **1.4.1.3 Purpose of Federal RACT**

The Clean Air Act requires RACT for certain sources in all nonattainment areas nationwide, regardless of the severity of the ozone problem.

“172(c) Nonattainment plan provisions

The plan provisions (including plan items) required to be submitted under this part shall comply with each of the following:

(1) In general

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<sup>3</sup> The Strelow RACT Memorandum, published in BNA Environmental Reporter, December 9, 1976, pages 1210-1212



Such plan provisions shall provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards.”

From this section, it is clear that RACT is intended as the minimum level of control that all ozone nonattainment areas must achieve for existing sources. It is also clear that RACT is not intended as the only level of control needed for all nonattainment areas to attain the ozone standard. Two key conclusions are drawn from the section above: first, states must adopt RACT for existing sources regardless if they are needed for attainment, and second, states may need additional measures beyond RACT to attain the standard. This second conclusion leads to the understanding that RACT is not intended to be the most stringent level of control in an area’s attainment strategy.

In the greater context of air pollution control levels, RACT is understood as the “floor-level” of air pollution controls, not the “ceiling-level.” More effective levels of emissions control are termed Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER). BACT and LAER are required for new sources, and for existing sources undergoing modification. Under state and federal air pollution programs, new facilities face more stringent pollution control requirements than existing facilities, with the understanding that better controls can be more easily implemented before a facility is built, than after it is built. New sources must generally implement BACT<sup>4</sup> and existing sources must implement a less stringent level of control such as Reasonably Available Control Technology (RACT). Additionally, California law establishes an intermediate level of control that is the “best available” for “retrofit” to existing sources (entitled Best Available Retrofit Control Technology – BARCT<sup>5</sup>), recognizing that the state’s worst ozone problems demands more effective pollution control than what is usually considered “reasonably available.”

As discussed above, the purposes of BACT, RACT, and BARCT are different. BACT is designed to minimize the growth in future stationary source emissions with the installation of best available controls; RACT is designed to reduce current stationary source emissions from existing sources with the application of reasonably available controls; and BARCT is designed to reduce current stationary source emissions even further with the application of best available retrofit controls. BACT is identified and prescribed in the permitting process on a case-by-case administrative basis. RACT and

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<sup>4</sup> Federal regulations for permitting new facilities require Best Available Control Technology (BACT) for new sources in attainment areas, and Lowest Achievable Emission Rate (LAER) – a generally more stringent level –for new sources in nonattainment areas. LAER differs from BACT in that economic costs are **not** considered for candidate LAER controls that are considered “Achieved in Practice.” Under California state law, the District is required to apply “BACT” for new sources under essentially the same requirements as federal LAER. The District’s “BACT” determinations thus fulfill the federal LAER requirements.

<sup>5</sup> California Health and Safety Code (CH&SC) 40406: ... “best available retrofit control 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.

BARCT are developed on an industry-wide basis in the rule development process, which concludes with quasi-legislative action by the District Governing Board.

#### **1.4.1.4 RACT Guidance from EPA Region IX**

A letter from EPA, Region IX<sup>6</sup> outlined documents that could be useful in establishing RACT. Those documents include EPA's Control Techniques Guidelines (CTGs), Alternative Control Techniques (ACTs), New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAPs), EPA Best Available Control Technology (BACT) Clearinghouse, California Suggested Control Measures (SCM) and RACT/Best Available Retrofit Control Technology (BARCT) determinations, regulations adopted in other Districts, and guidance and rules developed by other state and local agencies.

#### **1.4.1.5 Issues Regarding Federal Expectations for RACT**

RACT is inherently a "moving target." Technology considered to meet RACT at the time of SIP-approval is generally rendered obsolete by more effective technology that is introduced at a later date. This view of moving-target RACT requirements precludes comparing District rules only to CTGs/ACTs or simply relying on EPA SIP-approval of rules as satisfying RACT requirements; therefore, other adopted air pollution control requirements, such as other districts' rules, must be considered.

It should also be noted that since District rules usually fulfill BARCT requirements for state purposes, and the control technology established by a BARCT rule is by definition the most effective retrofit control for the source category; it can be assumed to, at a minimum, satisfy RACT requirements, if not go beyond RACT.

#### **1.4.2 RACT Demonstration Process**

The preparation of this report required intensive effort by numerous District staff including engineers and specialists from the Planning and Permit Services Departments. The analysis required careful and wide-ranging examination of individual rules against multiple federal rules, regulations, and technology guidelines as well as evaluating District rules against comparable rules from California's most technologically progressive air districts.

The process began by comparing District rules to EPA's CTGs. There are a total of 42 CTGs, twelve of which were promulgated by EPA after the original August 17, 2006 RACT SIP analysis was adopted. Chapter 2 of this report links the EPA-promulgated CTGs with the District rules that cover the same source category, and discusses two CTGs that have no applicable facilities in the SJVAB.

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<sup>6</sup> United States Environmental Protection Agency – letter from Andrew Steckel, EPA Region IX to Kurt Karperos, ARB dated March 9, 2006 – RACT SIP

The next part of the process was to identify the major sources of NO<sub>x</sub> and VOCs in the SJVAB. For this demonstration, District staff began with the federal Clean Air Act definition of major source. In the Clean Air Act, what constitutes a major source depends on the nonattainment classification of the area where the source is located. With its 2007 Ozone Plan, the District has requested that its nonattainment classification be changed to extreme nonattainment, meaning that the definition of major source for NO<sub>x</sub> or VOC is one that has the potential to emit of at least 10 tons per year. The connection between the SJVAB's major sources and applicable District rules is outlined in Chapter 3 of this report. The District's database of current Permits-to-Operate was queried to find those sources that have the potential to emit at least ten tons per year of either NO<sub>x</sub> or VOC. Chapter 3 contains a list of all of the facilities that have the potential to emit of at least ten tons per year of either NO<sub>x</sub> or VOC and the NO<sub>x</sub> and VOC rules to which the facility's equipment is subject.

Finally, in Chapter 4 are RACT evaluations of current District rules. All of the District's NO<sub>x</sub> and VOC prohibitory rules are addressed in this RACT demonstration. The rules were rigorously compared to federal and state regulations and guidance on emission controls. As agreed to by EPA staff, the rules were also compared to analogous regulations adopted by California's most technologically progressive air districts: South Coast Air Quality Management District, Bay Area Air Quality Management District, Sacramento Metropolitan Air Quality Management District, and Ventura County Air Pollution Control District.

### **1.4.3 Public Process**

In keeping with the District's philosophy of public accountability, the results of the comprehensive analysis became available for public review on March 16, 2009. Public comments will be accepted and incorporated into the analysis as appropriate. The District's Governing Board will consider this report at the April 16, 2009 meeting. The report will subsequently be transmitted to ARB who will then submit the report to EPA by May 15, 2009. EPA staff will then evaluate the submission. The demonstration would:

- Fulfill a District obligation under the one-hour ozone planning requirements to show that District rules implement RACT;
- Fulfill a District obligation under the eight-hour ozone planning requirements to show that District rules implement RACT;
- Demonstrate the eight District rules currently in limbo at EPA implement RACT; and
- Stop the two sanction clocks started by the EPA's finding of "failure to submit".

## **1.5 GLOSSARY**

The following terms are used in discussion of the control measure and technology requirements in this report:

- Best Available Control Technology (BACT): The most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions for given regulated air pollutants and processes. Federal BACT is a requirement of New Source Review (NSR) and Prevention of Significant Deterioration (PSD).
  
- Best Available Retrofit Control Technology (BARCT): A California emission standard that applies to existing sources and is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source (California Health and Safety Code (CH&SC) Section 40406).
  
- Reasonably Available Control Technology (RACT): Devices, systems, process modifications, or other apparatus or techniques that are reasonably available, taking into account the necessity of imposing such controls in order to attain and maintain a national ambient air quality standard; the social, environmental, and economic impact of such controls; and alternative means of providing for attainment and maintenance of such a standard. These control techniques, which are defined in EPA guidelines for limiting emissions from existing sources in nonattainment areas, are adopted and implemented for nonattainment areas by state analysis.

## Chapter 2

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# **CONTROL TECHNIQUES GUIDANCE (CTG) SOURCE CATEGORIES AND APPLICABLE DISTRICT RULES**

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## **Chapter 2: CTG Source Categories and Applicable District Rules**

### **2.1 DISTRICT IMPLEMENTATION OF EPA CTGS**

As a part of its RACT SIP analysis, the District is required to assure that EPA's CTGs are being appropriately implemented through District regulations, . For this part of the analysis, staff matched the list of CTGs to District rules that apply to CTG source categories.

#### **2.1.1 CTG Sources**

There are a total of 42 CTGs, twelve of which have been promulgated by EPA after the original August 17, 2006 RACT SIP analysis was adopted. For this demonstration, District staff reviewed District rules for matching CTG source categories, and then compared the rule requirements to the CTG recommendations. The demonstration that District rules implement CTGs is part of Chapter 4.

Table 2-1 shows the CTGs promulgated by the EPA to-date, and the corresponding District rules.

Table 2-1: Control Techniques Guidelines				
Description	Pollutant	EPA Report	Date	District Rules
Design Criteria for Stage I Vapor Control Systems – Gasoline Service Stations	VOC	EPA-450/R-75-102	1975/11	4622
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume I: Control Methods for Surface Coating Operations	VOC	EPA-450/2-76-028	1976/11	<i>Note – Although often listed with the CTGs for historical reasons, this document does not define RACT for any source. It is a compilation of control techniques.</i>
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks	VOC	EPA-450/2-77-008	1977/05	4602, 4604, 4607, 4612
Control of Volatile Organic Emissions from Solvent Metal Cleaning	VOC	EPA-450/2-77-022	1977/11	4662
Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds	VOC	EPA-450/2-77-025	1977/10	4453, 4454, 4455, 4625
Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals	VOC	EPA-450/2-77-026	1977/10	4621, 4624
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume III: Surface Coating of Metal Furniture	VOC	EPA-450/2-77-032	1977/12	4603
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume IV: Surface Coating of Insulation of Magnet Wire	VOC	EPA-450/2-77-033	1977/12	4605
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume V: Surface Coating of Large Appliances	VOC	EPA-450/2-77-034	1977/12	4603
Control of Volatile Organic Emissions from Bulk Gasoline Plants	VOC	EPA-450/2-77-035	1977/12	4621
Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed-Roof Tanks	VOC	EPA-450/2-77-036	1977/12	4623
Control of Volatile Organic Emissions from Use of Cutback Asphalt	VOC	EPA-450/2-77-037	1977/12	4641
Control Techniques for Volatile Organic Emissions from Stationary Sources	VOC	EPA-450/2-78-022	1978/05	<i>Note – This document is often listed with CTGs, but it does not define RACT for any particular source</i>
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume VI: Surface Coating of Miscellaneous Metal Parts and Products	VOC	EPA-450/2-78-015	1978/06	4603
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume VII: Factory Surface Coating of Flat Wood Paneling	VOC	EPA-450/2-78-032	1978/06	4606
Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment	VOC	EPA-450/2-78-036	1978/06	4453, 4454, 4455, 4625



Table 2-1: Control Techniques Guidelines

Description	Pollutant	EPA Report	Date	District Rules
Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products	VOC	EPA-450/2-78-029	1978/12	Negative Declaration
Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires	VOC	EPA-450/2-78-030	1978/12	4681
Control of Volatile Organic Emissions from Existing Stationary Sources – Volume VIII: Graphic Arts-Rotogravure and Flexography	VOC	EPA-450/2-78-033	1978/12	4607
Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks	VOC	EPA-450/2-78-047	1978/12	4623
Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems	VOC	EPA-450/2-78-051	1978/12	4621
Control of Volatile Organic Compound Emissions from Large Petroleum Dry Cleaners	VOC	EPA-450/3-82-009	1982/09	4672
Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins	VOC	EPA-450/3-83-008	1983/11	4682, 4684
Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants	VOC	EPA-450/3-83-007	1983/12	4409, 4455
Control of Volatile Organic Compound Leaks from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment	VOC	EPA-450/3-83-006	1984/03	4682, 4684
Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry	VOC	EPA-450/3-84-015	1984/12	4455
Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations in Synthetic Organic Chemical Manufacturing Industry	VOC	EPA-450/4-91-031	1993/08	4455
Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations	VOC	EPA-453/R-96-007	1996/04	4606
Control Techniques Guidelines for Shipbuilding and Ship Repair Operations (Surface Coating)	VOC	61 FR-44050	1996/08	Negative Declaration
Aerospace (CTG & MACT)	VOC	EPA-453/R-97-004	1997/12	4605
Control Techniques Guidelines for Industrial Cleaning Solvents	VOC	EPA-453/R-06-001	2006/09	4601, 4607 (screen print, flexo), 4663, 4684 (not fiberglass boat mfg)
Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing	VOC	EPA-453/R-06-002	2006/09	4607
Control Techniques Guidelines for Flexible Package Printing	VOC	EPA-453/R-06-003	2006/09	4607
Control Techniques Guidelines for Flat Wood Paneling Coatings	VOC	EPA-453/R-06-004	2006/09	4606
Control Techniques Guidelines for Paper, Film, and Foil Coatings	VOC	EPA 453/R-07-003	2007/09	4607

<b>Table 2-1: Control Techniques Guidelines</b>				
<b>Description</b>	<b>Pollutant</b>	<b>EPA Report</b>	<b>Date</b>	<b>District Rules</b>
Control Techniques Guidelines for Large Appliance Coatings	VOC	EPA 453/R-07-004	2007/09	4603
Control Techniques Guidelines for Metal Furniture Coatings	VOC	EPA 453/R-07-005	2007/09	4603
Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings	VOC	EPA 453/R-08-003	2008/09	4603
Control Techniques Guidelines for Fiberglass Boat Manufacturing Materials	VOC	EPA 453/R-08-004	2008/09	4684
Control Techniques Guidelines for Miscellaneous Industrial Adhesives	VOC	EPA 453/R-08-005	2008/09	4653
Control Techniques Guidelines for Automobile and Light-Duty Truck Assembly Coatings	VOC	EPA 453/R-08-006	2008/09	4612
Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Primer-Surfacer and Topcoat Operations	VOC	EPA 453/R-08-002	2008/09	Not applicable - does not recommend emission limits or work practices

## 2.1.2 CTGs Without Subject Facilities

If there are no facilities within the District's boundaries that are subject to a particular CTG, the District Governing Board has two options. The first option is to create and implement a RACT rule for the CTG source category, even though there would be no source subject to the rule. The second option requires the District's Governing Board to approve a negative declaration as a signed, Governing Board resolution, stating that there are no major sources and no minor sources that would be subject to a given CTG. As required by the implementation rule for the eight-hour NAAQS, District staff reviewed all of the CTGs and found two CTGs without applicable facilities in the SJVAB:

- Surface coating at shipbuilding and ship repair facilities
- Pharmaceutical manufacturing

In its August 2006 RACT SIP analysis, District staff investigated whether major or minor sources that could be subject to these CTGs existed within the District's boundaries. If District staff had found sources, the District would have had to adopt and implement prohibitory rules for these sources. At that time, District staff found no sources that could be subject to the CTGs listed above and prepared a negative declaration in the form of a Governing Board resolution. With this submission, District staff has re-evaluated whether there are major or minor sources subject to these CTGs within the District's boundaries, and found that there are none. Therefore, District staff is recommending that the Governing Board re-affirm the August 2006 negative declaration for these source categories with another signed resolution.

### 2.1.2.1 Surface Coating Operations at Ship-Building and Ship Repair Facilities (61 FR-44050)

The only port in the SJVAB large enough to support a shipbuilding or ship repair facility for vessels 20 meters or more in length is the Port of Stockton. Located on the Stockton Deepwater Ship Channel, 75 nautical miles due east of the Golden Gate Bridge, the Port of Stockton, California, owns and operates a diversified and major transportation center that encompasses a 2,000-acre operating area. The Port is one mile from Interstate 5, and all interconnecting major highway systems. Rail service is provided by two transcontinental railroads, Union Pacific and the Burlington Northern Santa Fe.

The Port has berthing space for 17 vessels. There is no width restriction of vessels, and ships up to 900 feet (275 meters) in length can navigate the Stockton Ship Channel. Vessels in the 45,000 to 55,000-ton class, and maximum 60,000-ton class (for certain wide-beam vessels) can use the channel fully loaded. Up to 80,000-ton class vessels can transit the channel partially loaded. The Port has first class warehouse storage and handling facilities for both dry and liquid bulk materials, facilities and equipment to handle break-bulk and containerized cargoes by land or by sea. Immediate access to two transcontinental railroads is complemented by two loop railroads, one on-dock, for accommodating unit trains for export of coal, petroleum coke, and ores, plus consolidation of rail shipments of inbound and outbound steel coils.

All of the Port's services are directed through one administrative complex. The Port of Stockton publishes tariffs, stevedores cargoes, assigns berths, supervises cargo activity, provides shipping documentation, accounting and rate quotations. It is a broad hands-on effort that includes marketing, traffic, property management, warehousing, distribution, data processing and police protection services to its customers. (Reference 1)

Although the Port of Stockton that can handle large marine vessels, the Port has no surface coating operations associated with shipbuilding or ship repair. A survey of the District's emissions inventory found minor amounts of marine coatings. However, further analysis determined that these emissions were associated with the surface coating of pleasure craft, a different source category than shipbuilding or ship repair. District staff assigned to inspect various operations at the Port of Stockton reported that there were no coatings operations related to shipbuilding or ship repair within the port. The management at the Port of Stockton has verbally re-confirmed this fact. On this basis, District staff recommends that the District Governing Board declare that there are no major or minor sources for surface coating operations at shipbuilding and ship repair facilities.

#### **2.1.2.2. Pharmaceutical Manufacturing Operations (EPA-450/2-78-029)**

The pharmaceutical industry includes the manufacture, extraction, processing, purification, and packaging of chemical materials to be used as medication for humans or animals. Pharmaceutical manufacturing is divided into two major processing stages, primary and secondary. Primary processing or manufacture is the production of the active ingredient or drug. Secondary processing is the conversion of the active drugs into products suitable for administration. Major pharmaceutical groups manufactured include:

- prescription-only medicines (POM), which usually are patented products;
- standard prescription-only medicines made to a recognized formula, which may be specified in standard industry reference books; and
- over-the-counter (OTC) or non-prescription products.

The principal manufacturing steps are: (a) preparation of process intermediates; (b) introduction of functional groups; (c) coupling and esterification; (d) separation processes (such as washing and stripping); and (e) purification of the final product. In addition, other product preparation steps include granulation; drying; tablet pressing, printing, and coating; filling; and packaging. Each of these steps may generate air emissions, liquid effluents, and solid wastes. (Reference 2)

District staff searched for pharmaceutical manufacturing within the District by looking for VOC emissions in emission inventory code (EIC) 410-995-5520-000 in the District's emission inventory. This EIC is used specifically for emissions from pharmaceutical manufacturers. There were no emissions in this EIC. A search of the District's permits database found that there are no facilities for any of the standard industrial codes (SICs) associated with pharmaceutical manufacturing, namely SICs in the range of 2830 through 2839. An Internet search for pharmaceutical manufacturers in the San Joaquin Valley yielded no results. Therefore, District staff concludes that there are no pharmaceutical manufacturers in the District and recommends that District Governing Board declare that there are no major or minor sources for pharmaceutical manufacturing within the SJVAB.

### **2.1.2.3 References**

1. Port of Stockton website - <http://www.portofstockton.com>
2. "Environmental Guidelines for Pharmaceutical Manufacturing" Multilateral Investment Guarantee Agency; *Fruit and Vegetable Processing*. January 31, 1996. [http://www.miga.org/miga\\_documents/PharmaceuticalManufacturing.pdf](http://www.miga.org/miga_documents/PharmaceuticalManufacturing.pdf)

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## Chapter 3

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# MAJOR SOURCES AND APPLICABLE RACT RULES

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## **Chapter 3: Major Sources and Applicable RACT Rules**

### **3.1 MAJOR SOURCE LISTING**

As discussed in Chapter 2, the District is required to evaluate the rules that apply to major sources. Staff began by querying the District's database of current Permits to Operate to identify the facilities that have the potential to emit at least ten tons per year of either NO<sub>x</sub> or VOC. The individual facilities are listed in Table 3-1, along with the NO<sub>x</sub> and VOC rules that apply to the facility's equipment.

Two clarifications should be noted in Table 3-1.

- First, several facilities shown in Table 3-1 will become subject to VOC rules that the District is currently developing. These facilities are identified with a mark in the column titled "New." For example, the District is currently developing Rule 4566 (Organic Waste Operations) and Rule 4694 (Brandy and Wine Aging Operations). These are the first rules of their kind anywhere (no other agency has an existing rule), and EPA has not promulgated a CTG for the category. When the District rule is adopted, it will in essence, establish RACT nationwide for those source categories.
- Second, in Table 3-1, there are several facilities where the units or processes are so small (or have such low throughputs), that the units are exempt from the District's prohibitory rule. These facilities are marked with an "o" instead of an "x" for a specific rule. It should be emphasized that a facility's exemption from a rule does not signify that the rule does not meet RACT. The District goes through a methodical and reasoned process as it develops the emission limits and applicability thresholds for its prohibitory rules, with input from EPA and stakeholders from numerous and diverse groups. Chapter 4 demonstrates how District rules meet or exceed RACT requirements, including exemption thresholds.



















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## **Chapter 4**

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### **Rule Analysis**

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## **Chapter 4: Rule Analysis**

### **4.1 RULES ANALYZED FOR RACT**

The bulk of the District's RACT Demonstration effort was to review the District's numerous NOx and VOC regulations for compliance with federal RACT requirements. Except for the rules shown in Table 4-2, District staff reviewed the applicability, stringency, and enforceability of every District NOx or VOC prohibitory rule. Table 4-1 shows the rules that District staff analyzed for RACT.

As discussed in Chapter 1, criteria for determining that RACT is satisfied included the RACT guidance from EPA, requirements per California law, and a comparison against multiple federal rules, regulations, and technology guidelines as well as evaluating District rules against comparable rules from California's most technologically progressive air districts. District staff, upon application of the criteria, was then able to determine RACT status for each rule.

It should be noted that if a District rule had been recently SIP-approved, it was understood that the rule had been evaluated by the EPA and found to fulfill RACT, and no detailed analysis was conducted. However, since RACT is a moving target, if there were no recent SIP-approvals for a rule, District staff performed a detailed analysis to evaluate rule requirements against current technology.

Table 4-1 District Rules Analyzed and Rule History

Rule #	Rule Title	Pollutants Controlled	CTG Source?	Date Adopted	Date Last Amended	Federal Register Publication Date	Federal Register Citation	Page Number
4103	Open Burning	minimize smoke impact	N	6/18/1992	5/17/2007	4/11/2006	71 FR 18216	4-8
4104	Reduction of Animal Matter	air contaminants	N	5/21/1992	-	1/2/2008	73 FR 48	4-21
4106	Prescribed Burning and Hazard Reduction Burning	VOC, NOx, SOx, PM	N	6/21/2001	-	2/27/2002	67 FR 8894	4-24
4301	Fuel Burning Equipment	NOx, SOx, combustion contaminant	N	5/21/1992	12/17/1992	5/18/1999	64 FR 26876	4-39
4306	Boilers, Steam Generators, and Process Heaters – Phase 3	NOx, CO	Y	9/18/2003	10/16/2008	5/18/2004	69 FR 28061	4-42
4307	Boilers, Steam Generators, and Process Heaters - 2.0 MMBtu/hr to 5.0 MMBtu/hr	NOx, CO	Y	12/15/2005	10/16/2008	5/30/2007	72 FR 29887	4-45
4308	Boilers, Steam Generators, and Process Heaters - 0.075 MMBtu/hr to 2.0 MMBtu/hr	NOx, CO	Y	10/20/2005	-	5/30/2007	72 FR 29886	4-47
4309	Dryers, Dehydrators and Ovens	NOx, CO	N	12/15/2005	-	5/30/2007	72 FR 29886	4-54
4311	Flares	NOx, VOC	N	6/20/2002	6/15/2006	2/26/2003	68 FR 8835	4-56
4313	Lime Kilns	NOx	N	3/27/2003	-	9/4/2003	68 FR 52510	4-59
4354	Glass Melting Furnaces	NOx, CO, VOC	N	9/14/1994	10/16/2006	8/1/2007	72 FR 41894	4-69
4401	Steam-Enhanced Crude Oil Production Well Vents	VOC	N	4/11/1991	12/14/2006	6/22/1998	63 FR 33854	4-73
4402	Crude Oil Production Sumps	VOC	N	4/11/1991	12/17/1992	1/2/2008	73 FR 48	4-76

Table 4-1 District Rules Analyzed and Rule History

Rule #	Rule Title	Pollutants Controlled	CTG Source?	Date Adopted	Date Last Amended	Federal Register Publication Date	Federal Register Citation	Page Number
4404	Heavy Oil Test Station – Kern County	VOC	N	5/21/1992	12/17/1992		not in SIP Submitted to EPA 5/2007	4-80
4407	In-situ Combustion Well Vents	VOC	N	5/19/1994	-	3/6/1995	60 FR 12121	4-82
4408	Glycol Dehydration Systems	VOC	N	12/19/2002	-	8/26/2003	68 FR 51187	4-84
4409	Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities	VOC	Y	4/20/2005	-	3/23/2006	71 FRv14653	4-86
4453	Refinery Vacuum Producing Devices or Systems	VOC	Y	5/21/1992	12/17/1992	1/2/2008	73 FR 48	4-88
4454	Refinery Process Unit Turnaround	VOC	Y	5/21/1992	12/17/1992	1/2/2008	73 FR 48	4-91
4455	Components at Refineries, Gas Processing Facilities, and Chemical Plants	VOC	Y	4/20/2005	-	3/23/2006	71 FR 14652	4-94
4565	Biosolids, Animal Manure, and Poultry Litter Operations	VOC	N	3/15/2007	-		New Rule – submitted to EPA	4-96
4570	Confined Animal Facilities	VOC	N	6/15/2006	-			4-99
4601	Architectural Coatings	VOC	N	4/11/1991	10/31/2001	1/2/2004	69 FR 34	4-170
4603	Surface Coating of Metal Parts and Products	VOC	Y	4/11/1991	10/16/2008	6/25/2002	67 FR 42726	4-172
4604	Can and Coil Coating Operations	VOC	Y	4/11/1991	9/20/2007	5/19/2005	70 FR 28826	4-189
4605	Aerospace Assembly and Component Coating Operations	VOC	Y	12/19/1991	9/20/2007	11/14/2003	68 FR 64537	4-196
4606	Wood Products Coating Operations	VOC	Y	12/19/1991	10/16/2008	6/26/2002	67 FR 42999	4-206
4607	Graphic Arts	VOC	Y	4/11/1991	12/18/2008	6/26/2002	67 FR 42999	4-215

Table 4-1 District Rules Analyzed and Rule History

Rule #	Rule Title	Pollutants Controlled	CTG Source?	Date Adopted	Date Last Amended	Federal Register Publication Date	Federal Register Citation	Page Number
4610	Glass Coating Operations	VOC	N	5/16/2002	4/17/2003	10/14/2004	69 FR 60962	4-234
4612	Motor Vehicle and Mobile Equipment Coating Operations-Phase II	VOC	Y	9/21/2006	9/20/2007		New Rule – submitted to EPA	4-238
4621	Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants	VOC	Y	4/11/1991	12/20/2007	4/19/2000	65 FR 20912	4-245
4622	Gasoline Transfer into Motor Vehicle Fuel Tanks	gasoline vapors	Y	5/21/1992	12/20/2007	3/24/2003	68 FR 14156	4-252
4623	Storage of Organic Liquids	VOC	Y	4/11/1991	5/19/2005	9/13/2005	70 FR 53937	4-253
4624	Organic Liquid Loading	VOC	N	4/11/1991	12/20/2007			4-255
4625	Wastewater Separators	VOC	Y	4/11/1991	12/17/1992	1/2/2008	73 FR 48	4-270
4641	Cutback, Slow Cure, and Emulsified Asphalt Paving and Maintenance Operations	VOC	Y	4/11/1991	12/17/1992	1/2/2008	73 FR 48	4-275
4642	Solid Waste Disposal Sites	VOC	N	7/20/1995	4/16/1998	7/26/2001	66 FR 38939	4-281
4651	Soil Decontamination Operations	VOC	N	4/16/1992	9/20/2007	7/25/1996	61 FR 38571	4-296
4652	Coatings and Ink Manufacturing	VOC		5/21/1992	12/17/1992			4-304
4653	Adhesives	VOC	N	3/17/1994	9/20/2007	5/7/2002	67 FR 30591	4-308
4661	Organic Solvents	VOC	Y	5/21/1992	9/20/2007	9/16/2003	68 FR 54167	4-314
4662	Organic Solvent Degreasing Operations	VOC	Y	4/11/1991	9/20/2007	7/22/2002	67 FR 47701	4-317
4663	Organic Solvent Cleaning, Storage, and Disposal	VOC	Y	12/20/2001	9/20/2007	7/22/2002	67 FR 47701	4-320
4672	Petroleum Solvent Dry Cleaning Operations	VOC	Y	4/11/1991	12/17/1992	1/2/2008	73 FR 48	4-323
4681	Rubber Tire Manufacturing	VOC	Y	5/16/1991	12/16/1993	8/17/1998	63 FR 43881	4-330



Table 4-1 District Rules Analyzed and Rule History

Rule #	Rule Title	Pollutants Controlled	CTG Source?	Date Adopted	Date Last Amended	Federal Register Publication Date	Federal Register Citation	Page Number
4682	Polystyrene, Polyethylene, and Polypropylene Products Manufacturing	VOC, CFC-11, CFC-12	Y	5/21/1992	9/20/2007	6/13/1995	60 FR 31086	4-338
4684	Polyester Resin Operations	VOC	Y	5/19/1994	9/20/2007	6/26/2002	67 FR 42999	4-345
4691	Vegetable Oil Processing Operations	VOC		4/11/1991	12/17/1992			4-353
4692	Commercial Charbroiling	VOC, PM		3/21/2002	-	6/3/2003	68 FR 33005	4-355
4693	Bakery Ovens	VOC	N	5/16/2002	-	4/26/2004	69 FR 22441	4-358
4694	Wine Fermentation and Storage Tanks	VOC	N	12/15/2005	-		New Rule – submitted to EPA	4-361
4702	Internal Combustion Engines – Phase 2	NOx, CO, VOC	N	8/21/2003	1/18/2007	1/10/2008	73 FR 1819	4-363
4703	Stationary Gas Turbines	NOx	N	8/18/1994	9/20/2007	5/18/2004	69 FR 28061	4-366
4902	Residential Water Heaters	NOx	N	6/17/1993	-	2/17/2004	69 FR 7370	4-372
4905	Natural Gas Fired, Fan-type, Residential Central Furnaces	NOx	N	10/20/2005	-	5/30/2007	72 FR 29886	4-375

Table 4-2 District NOx and VOC Rules Not Analyzed						
Rule #	Rule Title	Pollutants Controlled	CTG Source?	Date Adopted	Date Last Amended	Notes
4304	Equipment Tuning Procedure for Boilers, Steam Generators, and Process Heaters	NOx, CO	N	10/19/1995	-	There are no NOx and VOC emission limits associated with this rule.
4305	Boilers, Steam Generators, and Process Heaters – Phase 2	NOx, CO	Y	12/16/1993	8/21/2003	This rule was superceded by Rules 4306, 4307, and 4308
4351	Boilers, Steam Generators, and Process Heaters – Reasonably Available Control Technology	NOx	N	10/20/1994	8/21/2003	This rule was superceded by Rules 4306, 4307, and 4308
4403	Components Serving Light Crude Oil or Gases at Light Crude Oil and Gas Production Facilities and Components at Natural Gas Processing Facilities	VOC	N	4/11/1991	4/20/2005	This rule was superceded by Rule 4409
4405	Oxides of Nitrogen Emissions from Existing Steam Generators Used in Thermally Enhanced Oil Recovery – Central and Western Kern County Fields	NOx	N	5/21/1992	12/17/1992	This rule was superceded by Rule 4306
4451	Valves, Pressure Relief Valves, Flanges, Threaded Connections and Process Drains at Petroleum Refineries and Chemical Plants	VOC	N	4/11/1991	4/20/2005	This rule was superceded by Rule 4455

Table 4-2 District NOx and VOC Rules Not Analyzed						
Rule #	Rule Title	Pollutants Controlled	CTG Source?	Date Adopted	Date Last Amended	Notes
4452	Pump and Compressor Seals at Petroleum Refineries and Chemical Plants	VOC	N	4/11/1991	4/20/2005	This rule was superceded by Rule 4455
4602	Motor Vehicle and Mobile Equipment Coating Operations	VOC	Y	4/11/1991	7/21/2006	This rule was superceded by Rule 4612
4701	Internal Combustion Engines – Phase 1	NOx, CO, VOC	N	5/21/1992	8/21/2003	This rule was superceded by Rule 4702
9310	School Bus Fleets	NOx, PM	N	9/21/2006	-	This rule does not regulate any major stationary sources

## Rule 4103 – Open Burning

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	4.8	4.8	4.7	4.7	4.7	4.6	4.6	4.5
VOC	5.7	5.7	5.6	5.6	5.6	5.5	5.5	5.4

(Source: District 2007 Ozone Plan)

### District Rule 4103 Description

District Rule 4103 applies to open burning conducted within the San Joaquin Valley Air Basin, with the exception of prescribed burning and hazard reduction burning which are subject to Rule 4106 (Prescribed Burning and Hazard Reduction Burning). District Rule 4103 includes the following requirements and prohibitions

#### General Requirements

- Prohibits open outdoor fire for disposal of or burning of petroleum wastes; demolition or construction debris; residential rubbish; garbage or vegetation; tires; tar; trees; woodwaste; or other combustible or flammable solid, liquid or gaseous waste; or for metal salvage or burning of motor vehicles.
- The APCO will allocate burning based on the predicted meteorological conditions and whether it would cause nuisance, impact smoke sensitive areas, or create or contribute to an exceedance of the ambient air quality standard.
- The APCO will restrict the time of day when burns are ignited and conducted.
- No open burning will be permitted that will create nuisance as defined in the state Health and Safety Code.

#### Agricultural Burning

- Prohibits issuance of burn permits for specific field crops, specific prunings from certain crops, and certain types of weed abatement, except for prunings from apple crops, pear crops, fig crops and quince crops as well as weed abatement activities affecting waterways (including ponding and levee banks) whereby burn permits may be issued until June 1, 2010.
- Requires the use of at least one best management practice specified in the rule (other practice approved by the APCO) for the control of certain type of weeds located along ditch banks or canal banks, and the disposal of pesticide sacks or fertilizer sacks.
- Allows issuance of permits for burning of rice stubble until June 1, 2015, but the amount of rice stubble that could be burned will be limited and will be incrementally reduced annually based on the percent of the total annual acreage of rice planted.

- Agricultural burn permits may be issued until June 1, 2010 for orchard removals of citrus, apple, pear, quince, and fig crops; or orchard removals of up to 20 acres per location per calendar year from other crops.
- Prohibits burning of agricultural waste unless it is arranged or loosely stacked so as to promote drying and insure combustion with minimum smoke.
- Ignite agricultural waste with an approved ignition device, and not burned unless it is free of excessive dirt, soil, and visible surface moisture.
- Prohibits burning of agricultural waste unless it is free of certain materials (plastic, rubber, ornament or landscape vegetation, shop waste, construction and demolition, etc.)
- Prohibits burning of orchard or vineyard removal waste, or other material, generated as a result of land use conversion from agricultural to nonagricultural purposes.
- Prohibits burning unless the material has been allowed to dry for a minimum specified time period.
- Monitor and attend burning to prevent smoldering; burn only during daylight hours; not add waste to existing fire after 5:00 PM; and ignite rapidly as practicable within applicable fire restrictions.

Field crop burning:

- Prohibits burning before 10:00 AM or after 2:00 PM of any day, unless local conditions indicate other hours are appropriate.
- Ignite only by strip burning into-the-wind or backfiring, except under a special permit and other special conditions/requirements.
- Rice harvesting must employ mechanical straw spreader but certain exceptions are allowed, but rice straw must be dried and meet crackle test criteria detailed in the rule.

Ditch Bank and Levee Maintenance

- Remove trash and debris prior to burning
- Prepare the material by stacking, drying, or other methods to promote combustion.

Contraband Materials

- Prohibits transporting contraband confiscated outside the District for disposal by burning within the District. Only contraband confiscated within the San Joaquin Valley air basin may be disposed off by burning.
- Submit written notification to the District of the planned burn prior to burning.
- Fires should only be set or allowed by a peace officer or public fire official in the performance of official duty.
- To the extent possible, materials must be burned in areas and in conditions limiting the possibility of smoke impacts on nearby neighbors or other sensitive areas.

Russian Thistle

- Maintain burn site in a fire safe condition according to local fire protection agency.
- Smoke and air contaminants must not impact smoke sensitive areas or cause/contribute to a nuisance, or create/contribute to exceedance of air quality standards.

Diseased Materials

- Requires a conditional burn permit for fires set for the purpose diseased or pest prevention.
- Requires certain specific conditions/determinations by the county agricultural commissioner confirming the presence of the disease and the effects of not allowing the burn in lieu of other disposal alternatives.

Administrative Requirements

- Specific procedures and conditions for burn permits, burn plans for fire suppression training, and contraband are detailed in the rule.

**How does District Rule 4103 compare with federal rules and regulations?**

**A. EPA – Control Technique Guidelines (CTG)**

District staff's review of the EPA CTG list indicates that there is no CTG for open burning.

**B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for open burning.

**C. Standards of Performance for New Stationary Sources (NSPS)**

District staff's review of 40 CFR 60 (Standards of Performance for New Sources) indicates that there is no NSPS for open burning.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

District staff's review of 40 CFR 61 (NESHAP) and 40 CFR (NESHAP for Source Categories) indicates that there is no NESHAP or MACT for open burning.

**How does District Rule 4103 compare to rules in other air districts?**

District staff compared District Rule 4103 with the rules of other California ozone nonattainment air districts' rules on open burning. The results of the analysis are discussed below.

- South Coast Air Quality Management District, Rule 444 (Open Burning) amended December 21, 2001
- Bay Area Air Quality Management District, Regulation 5 (Open Burning) amended November 2, 1994
- Sacramento Metropolitan Air Quality Management Air District, Rule 407 (Open Burning) amended June 4, 1998
- Ventura County Air Pollution Control District) Rule 56 (Open Burning) amended November 11, 2003

**A. South Coast AQMD Rule 444 (Open Burning)**

SCAQMD Rule 444 applies to open burning of agricultural waste, disposal of Russian thistle, prescribed burning, fire prevention/suppression training, open detonation or use of pyrotechnics, fire hazard, disposal of infectious wastes (other than hospital waste), research and testing materials equipment or techniques, disposal of contraband, and residential burning.

SCAQMD Rule 444 prohibits open burning unless:

- The executive officer has declared the day as a permissive burn day and such burning is not prohibited by a public fire protection agency.
- A written permit and an authorization are obtained from the executive for each day for each open burning.

SCAQMD Rule 444 allows open burning for:

- Agricultural burning;
- Prescribed burning;
- Disposal of Russian thistle;
- Fire hazard abatement that a fire protection agency determines cannot be abated by any viable option;
- Disposal of waste infected with agricultural pest or disease and ordered by the county agricultural commissioner;
- Disposal of infectious waste (other than hospital waste) ordered by the county health officer;
- Use of pyrotechnics for creation of special effects in motion pictures, etc.;
- Disposal of contraband in the possession of law enforcement personnel provided burning is the only available reasonable method for safe disposal; and
- Fire prevention training; and researching and testing fire retardant properties of materials, etc.

SCAQMD Rule 444 prohibits open burning for

- Residential burning;

- Disposal of waste except as mentioned above;
- Materials generated as a result of land use conversion for non-agricultural purposes;
- Disposal of materials from the production or storage of military ordnance, etc.; and
- Wildland suppression fires except those set by fire protection agencies to save life and property.

SCAQMD Rule 444 requires open burning to comply with the following:

- Agricultural field crop burning must commence before 10:00 AM or later than 5:00 PM;
- Open burning other than field crop burning must not commence earlier than one hour after sunrise with no new ignition, or fuels to be added to an existing fire, later than two hours before sunset except as authorized at a time consistent with an approved smoke management plan;
- Use only approved ignition device
- Prior to burning, agricultural waste must be allowed to dry for a specified time as detailed in the rule;
- Agricultural waste must be free of dirt, soil and visible moisture; and
- Ignite rice, barley, oat, and wheat straw only by strip-firing or backfiring into the wind unless fire protection agency declares such actions would constitute a fire hazard.

SCAQMD Rule 444 specifies that the executive officer may allow the certain specified maximum daily burn acreage for agricultural burning and prescribed burning as follows:

- Except for Coachella Valley, 150 acres for prescribed wildland and range burning, and 150 acres for agricultural burning.
- For Coachella Valley, 5 acres for prescribed wildland and range burning and 35 acres for agricultural burning.
- The above restrictions do not apply to prescribed burning when a land manager demonstrates that it is required to reduce fire hazard that jeopardized public health and safety and a satisfactory smoke management plan is submitted and approved by the air district.

SCAQMD Rule 444 exempts the following:

- Wildfire suppression ignited to save life and valuable property conducted by fire protection agency.
- Fire prevention/suppression training, except for the burning of existing structure, conducted by fire protection agency for no more than 30 minutes. Training involving burning of existing structure is exempt provided each training is no more than 30 minutes.
- Burning of Russian thistle is exempt from having to get authorization from the district.
- Recreational fires or ceremonial fires.
- Open burning of natural gas, propane, untreated wood, or charcoal for the purpose of preparation or warming of food for human consumption or generating warmth for social gathering.
- Open burning located on islands 15 miles or more from the mainland coast.



- Fireworks displays or pyrotechnics used for the creation of special effects at theme parks.
- Detonation of explosives during quarry mining operations, bomb disposal by law enforcement agency, or demolition of buildings or structures.
- Pyrotechnics, detonation of explosives, or fire effects for creation of special effects during theatrical productions, filming of motion pictures, videotaping of television programs or other commercial filming or video production activities must not be more than 30 minutes in duration.

SCAQMD Rule 444 applies to a variety of open burning activities which includes prescribed burning and hazard reduction burning which are not regulated by District Rule 4103, but are regulated by District 4106 (Prescribe Burning and Hazard Reduction Burning).

Overall, District Rule 4103 is more stringent than SCAQMD Rule 444 for the following major reasons:

- District Rule 4103 prohibits open burning of almost all agricultural wastes, except prunings from apples crops, pears crops, fig crops, and quince crops, as well as weed abatement activities affecting waterways for which open burning is allowed until June 1, 2010. District Rule 4103 allows open burning of orchard removal from citrus, apple, pear, quince, fig crops and orchard removal of up to 20 acres per location per calendar year until June 1, 2010, the burning of rice straw until June 1, 2015. Rule amendment project for 2009 would implement Phase IV of the state Health and Safety Code will address prohibition of burning of surface harvested crops prunings (almond, walnut, pecan and grape vines), vineyard removal, vineyard materials (grape canes and raisin trays), and other materials (brooder paper, diseased goats, and diseased beehives). SCAQMD Rule 444 allows open burning of agricultural waste.
- District Rule 4103 requires the use of at least one best management practice specified in the rule (other practice approved by the APCO) for the control of certain type of weeds located along ditch banks or canal banks, and the disposal of pesticide sacks or fertilizer sacks. SCAQMD Rule 444 has no similar restrictions for burning weeds.
- Prohibits transporting contraband confiscated outside the District for disposal by burning within the District. Only contraband confiscated within the San Joaquin Valley air basin may be disposed off by burning. SCAQMD Rule 444 allows burning of contraband in the possession of law enforcement personnel regardless of where the contraband originated.
- District Rule 4103 does not allow open burning that will create a nuisance as defined in Section 41700 of the state Health and Safety Code, but SCAQMD Rule 444 does not specify such restriction.

Based on the above discussion, District staff deems that District Rule 4103 is more stringent than SCAQMD Rule 444.

**B. Bay Area AQMD Regulation 5 (Open Burning)**

BAAQMD Regulation 5 applies to open burning of agricultural waste, range management, forest management, and wildland management. The rule prohibits a person from igniting, causing to ignite, permit to be ignited, or suffer, allow, or maintain fires within the district. No burning should take place in the district on other than a permissive burn day.

BAAQMD Regulation 5 allows the following fires on permissive burn days:

- Disease and pests prevention;
- Crop replacement;
- Orchard pruning and attrition;
- Double cropping stubble;
- Hazardous materials (prevention or reduction of fire hazard, disposal of dangerous materials);
- Fire training;
- Flood debris;
- Control growth of vegetation from irrigation ditches and canals;
- Disposal of material which is lying or growing within natural channels or flood control channels;
- Fires set for the purpose of range management and grazing;
- Fires set for the purpose of removing forest debris and for forest management;
- Fires set for the purpose of improvement of lowland and marsh for wildlife and game habitat;
- Fires set for the purpose of disposing contraband;
- Prescribed burning by state or federal agency, or through cooperative agreement or contract involving state or federal agency.
- Fires set as part of commercial film or video production activities for motion picture and television.
- Fires set as part of a planned civic event designed to educate or otherwise benefit the public.

BAAQMD Regulation 5 requires that any person conducting open burning that is allowed by the rules must also comply with the following:

- No burning should take place before sunrise.
- No additional materials or fuel should be ignited nor should any material or fuel be added to any fire after two hours before sunset.
- No material or fuel should be ignited nor should any material or fuel be added to any fire when the wind velocity is less than 5 miles per hour except for certain conditions specified in the rule.
- The material should be dried for a minimum of 60 days prior to ignition.
- All material to be burned should be reasonably free from dirt or soil.
- Piled material should be limited to 25 square yards base area and the height should be at least 2/3 of the average width of the pile.
- Ignition material should be limited to those listed by the state director of forestry.

- Ignition should be started at or near the top of the piled material.
- Tonnage, volume or acreage of material burned on any given day at any given site is subject to limitations set by the APCO, but may not exceed any limits set by ARB.

BAAQMD Regulation 5 requires the submission of burn plan and the APCO's approval prior to burning. The rule specify the requirements that must be met when burning of propellants, explosives, pyrotechnics, disease and pests, fire training, flood control, irrigation ditches, range management, hazardous materials, and contraband as wells prescribed burning, filmmaking petition. The rule also includes recordkeeping and monitoring requirements.

BAAQMD Regulation 5 exempts fires set for cooking food for human consumption; fires set for recreational purposes using only clean dried wood or charcoal, and small amount of fire starter; fires burning as safety flares or for combustion of waste gases; use of flame cultivation using only LPG or natural gas fired burners designed and used to kill seedling grass and weeds in orchards, vineyards and field crops and the growth is such that the combustion will continue without the burner; and fires set for training purposes using one gallon or less of flammable liquid per fire..

BAAQMD Regulation 5 applies to a variety of open burning activities which includes prescribed burning and hazard reduction burning which are not regulated by District Rule 4103, but are regulated by District 4106 (Prescribe Burning and Hazard Reduction Burning).

Overall, District Rule 4103 is more stringent than BAAQMD Regulation 5 for the following major reasons:

- District Rule 4103 prohibits open burning of almost all agricultural wastes, except prunings from apples crops, pears crops, fig crops, and quince crops, as well as weed abatement activities affecting waterways for which open burning is allowed until June 1, 2010. District Rule 4103 allows open burning of orchard removal from citrus, apple, pear, quince, fig crops and orchard removal of up to 20 acres per location per calendar year until June 1, 2010, the burning of rice straw until June 1, 2015. Rule amendment project for 2009 would implement Phase IV of the state Health and Safety Code will address prohibition of burning of surface harvested crops prunings (almond, walnut, pecan and grape vines), vineyard removal, vineyard materials (grape canes and raisin trays), and other materials (brooder paper, diseased goats, and diseased beehives). BAAQMD Regulation 5 allows open burning of agricultural waste.
- BAAQMD Regulation 5 exempts use of flame cultivation using only LPG or natural gas fired burners designed and used to kill seedling grass and weeds in orchards, vineyards and field crops and the growth is such that the combustion will continue without the burner, but District Rule has no similar exemption.
- District Rule 4103 requires the use of at least one best management practice specified in the rule (other practice approved by the APCO) for the control of certain type of weeds located along ditch banks or canal banks, and the disposal of

pesticide sacks or fertilizer sacks. BAAQMD Regulation 5 has no similar restrictions for burning weeds.

- District Rule 4103 prohibits transporting contraband confiscated outside the District for disposal by burning within the District. Only contraband confiscated within the San Joaquin Valley air basin may be disposed off by burning. BAAQMD Regulation 5 allows burning of contraband in the possession of law enforcement personnel regardless of where the contraband originated.
- BAAQMD Regulation 5 regulates range management, forest management, and wildland management which are not regulated by District Rule 4103 but are regulated by District 4106 (Prescribe Burning and Hazard Reduction Burning).

Based on the above discussion, District staff deems that District Rule 4103 is more stringent than BAAQMD Regulation 5.

### **C. Sac Metro AQMD Rule 407 (Open Burning)**

SMAQMD) Rule 407 applies to non-agricultural open outdoor fires. Agricultural burning is regulated under SMAQMD Rule 501 (Agricultural Burning).

SMAQMD) Rule 407 prohibits the following:

- Burning of petroleum waste, demolition waste, tires, trees, wood waste, or other combustible or flammable solid or liquid waste, motor vehicle bodies, materials for the purpose of metal salvage, putrescible materials, bedding, asphaltic products, or rubber products.
- Burning or allowing to be burned, or maintaining any open outdoor fire for the purpose of burning refuse or organic waste on an agricultural no-burn day.
- Burning or allowing to be burned, or maintaining any open outdoor fire for the purpose of burning refuse or organic waste at any time at certain locations specific in the rule.

Overall, District Rule 4103 is more stringent than SMAQMD Rule 407 for the following major reasons:

- Unlike District Rule 4103, SMAQMD Rule 407 does not require submission of burn plans or obtaining burn permits prior to burning the materials.
- Unlike District Rule 4103, SMAQMD Rule 407 does not allocate burning based on the predicted meteorological conditions and whether it would cause nuisance, impact smoke sensitive areas, or create or contribute to an exceedance of the ambient air quality standard.
- Unlike District Rule 4103, SMAQMD Rule 407 does not restrict the time of day when burns are ignited and conducted.
- Unlike District Rule 4103, SMAQMD Rule 407 does not require the use of at least one best management practice for the control of certain type of weeds located along ditch banks or canal banks.

Based on the above discussion, District staff deems that District Rule 4103 is more stringent than SMAQMD Rule 407.

#### **D. Sac Metro AQMD Rule 501 (Agricultural Burning)**

SMAQMD Rule 501 regulates agricultural burning. Agricultural burning is defined in the rule as open outdoor fires to dispose agribusiness waste, agribusiness-related waste, forest management, range improvement, improvement of land for wildlife and game habitat, prevention of disease or pests, irrigation system management, wild land vegetation management, or disposal of empty paper containers of agricultural chemicals.

SMAQMD Rule 501 prohibits igniting, conducting, or allowing agricultural burning on a no-burn day, except as when the designated agency determines that denial of burn permission would pose imminent and substantial economic loss and the designated agency approves or conditionally approves a special permit authorizing such burning on a no-burn day. The authorization to burn during no-burn day will limit the amount of acreage that may be burned in any one day and when the downwind populated areas are forecast by the district or designated agent to achieve the state and federal ambient air quality standards.

SMAQMD Rule 501 requires obtaining a burning permit prior to igniting, conducting, or allowing agricultural burning. The rule prohibits the burning of material that is not clearly described in the authorized burn permit. An approved burn permit is not valid for any time when agricultural burning is prohibited by either the State Board or the APCO or has been restricted by the APCO. A permit holder or any other person is not exempt from any fire control or prevention statute or regulation, or if burning is prohibited by a public fire control agency.

SMAQMD Rule 501 specifies the following standards for all agricultural burning:

- The acreage shall not exceed should not exceed the acreage allotment determined pursuant to the agricultural Burning Plan.
- The APCO may restrict agricultural burning to less than the State-allotted acreage or may declare a no-burn day in all or in part of the district depending on meteorological conditions that would cause undue emissions to be transported to a sensitive receptor or populated areas or cause a nuisance.
- No agricultural burning will be conducted when the wind direction is such that smoke from the burn will cause or does cause a nuisance.
- Contact the designated agency or fire protection agency having jurisdiction over the burn location prior to the burn, on the same day as the burn.
- Ignite using an approved ignition device. Other ignition methods may be authorized by special permit when and where the fire protection agency has declared that an extreme fire hazard exists or where the designated agency has determined that crops do not lend itself to strip-firing or backfiring
- For field crop stubble, ignite by strip-firing into the wind or backfiring.
- Specifies the allowable ignition hours.
- Specifies materials that are prohibited to be burned as part of any type of agricultural burning.

- Requires agricultural waste to be arranged to burn with minimum of smoke.
- Requires a minimum drying time prior to burning agricultural waste.
- Requires a mechanical rice straw spreader to be used in rice harvesting to ensure even distribution of the straw, but rice straw may be left in rows provided it meets the specified drying time prior to being burned.
- Except for rice straw acreage that was harvested prior to September 10, prohibits burning of field crop acreage during October 1 through November 15 of each year, unless a special permit is approved.
- Prohibits agricultural burning in the certain boundary in the northwest Sacramento area if the APCO or fire protection agency predicts that winds will be from the direction within 90 degrees of true north. The exception is if the burning is necessary to preclude hazards on public thoroughfares or at airports due to smoke or can be performed without causing a nuisance.
- Burn only agribusiness waste or agribusiness-related waste that is reasonably free of excessive dirt, soil, and visible moisture.
- Agricultural burning must occur where the material being burned was grown or raised, or in the case of agribusiness-related waste, used.
- Specifies certain standards for forest management burning, range improvement burning, irrigation system management, wildland vegetation management burning, and burning of empty paper containers of agricultural chemicals.
- Specify administrative requirements for permit application information, approval of burning permits, permit statement, advance notice request, and suspension or revocation of approved permit.

Overall, District Rule 4103 is more stringent than SMAQMD Rule 501 for the following major reasons:

- District Rule 4103 prohibits open burning of almost all agricultural wastes, except prunings from apples crops, pears crops, fig crops, and quince crops, as well as weed abatement activities affecting waterways for which open burning is allowed until June 1, 2010. District Rule 4103 allows open burning of orchard removal from citrus, apple, pear, quince, fig crops and orchard removal of up to 20 acres per location per calendar year until June 1, 2010, the burning of rice straw until June 1, 2015. SMAQMD Rule 501 allows open burning of agricultural waste.
- SMAQMD Rule 501 regulates forest management burning, range improvement burning, wildlife and game habitat which are not regulated by District Rule 4103 but are regulated by District 4106 (Prescribe Burning and Hazard Reduction Burning).
- Unlike District Rule 4103, SMAQMD Rule 407 does not require the use of at least one best management practice for the control of certain type of weeds located along ditch banks or canal banks.

Based on the above discussion, District staff deems that District Rule 4103 is more stringent than SMAQMD Rule 501.

## E. Ventura County APCD Rule 56 (Open Burning)

VCAPCD Rule 56 applies to the burning of combustible materials in open outdoor fires. The rule allows open burning provided the following requirements are met:

- A valid burn permit must be obtained prior to burning.
- Open burning is allowed only on days declared to be Burn Days by the APCO.
- Open burning is allowed for disposal of agricultural waste in the pursuit of agricultural operations, range improvement, wildland vegetation management, levee, reservoir or ditch maintenance, and disposal of Russian thistle.
- Burn only plant material that grew on property where the burn is conducted, or on another property of the same grower if approved by APCO.
- Material to be burned should be reasonably free from dirt, soil and visible moisture.
- Material to be burned should sufficiently dry (except for prescribed burning) for the minimum time period specified in the rule.
- Material to be burned should be stacked or arranged to allow maximum air circulation to minimize smoke during combustion.
- Use only ignition device approved by the APCO or the fire protection agency, and should be ignited as rapidly as practicable within fire control restrictions.
- Conduct open burning when wind speed and direction will not carry emissions into smoke sensitive areas.
- Conduct burning during time periods specified in the rule.
- The amount, timing, and location of all open burning will be restricted by the district to minimize smoke impacts on smoke sensitive areas.

VCAPCD Rule 56 includes specific requirements for prescribed burning and range improvement burning. Among other things, range improvement burning requires a statement from the Department of Fish and Game certifying that burning is desirable and proper. For prescribed burning, the land manager should submit a smoke management plan that includes specific information detailed in the rule for review and approval by the district. Additionally, for prescribed burning, the land manager should register all planned burn projects annually or seasonally to the district.

VCAPCD Rule 56 exempts outdoor fires for the following purposes:

- Heating or cooking food for human consumption or for recreational purposes.
- Burning of unserviceable American flag.
- Fires authorized public officer to prevent fire hazard, training in the methods of fighting fires, etc.
- Setting of backfires to save life or valuable property.
- Abatement of fire hazards.
- Disease or pest prevention.
- Remediation of oil spill.

Overall, District Rule 4103 is more stringent than VCAPCD Rule 56 for the following major reasons:

- District Rule 4103 prohibits open burning of almost all agricultural wastes, except prunings from apples crops, pears crops, fig crops, and quince crops, as well as weed abatement activities affecting waterways for which open burning is allowed until June 1, 2010. District Rule 4103 allows open burning of orchard removal from citrus, apple, pear, quince, fig crops and orchard removal of up to 20 acres per location per calendar year until June 1, 2010, the burning of rice straw until June 1, 2015. VCAPCD Rule 56 allows open burning of any agricultural waste.
- VCAPCD Rule 56 regulates range improvement burning, wildlife and game habitat and prescribed burning which are not regulated by District Rule 4103 but are regulated by District 4106 (Prescribe Burning and Hazard Reduction Burning).
- Unlike District Rule 4103, VCAPCD Rule 56 does not require the use of at least one best management practice for the control of certain type of weeds located along ditch banks or canal banks.

### **Conclusion**

There are no federal rules and regulations that apply to open burning. After careful evaluation the prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4103 satisfies RACT for open burning.



## Rule 4104 (Reduction of Animal Matter)

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ
VOC	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ

(Source: District 2007 Ozone Plan)

### District Rule 4104 Description

Rule 4104 applies to source operations used for the reduction of animal matter which involves any heated process, including rendering, cooking, drying, dehydration, digesting, evaporating, and protein concentration. The rule prohibits operation of any machine/equipment used in reduction of animal matter unless all gases, vapors, and gas-entrained effluent are incinerated at a temperature of at least 1200°F for a period of not less than 0.3 seconds, or processed in a manner that is equally or more effective as determined by the APCO.

### How does District Rule 4407 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

District staff's review of the EPA CTG list indicates that there is no CTG for reduction of animal matter.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for reduction of animal matter.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

40 CFR 60 (Standards of Performance for New Sources) does not specify any NSPS for reduction of animal matter.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

40 CFR 61 (NESHAP) and 40 CFR (NESHAP for Source Categories) do not specify any NSPS for reduction of animal matter.

**How does District Rule 4104 compare to rules in other air districts?**

District staff compared District Rule 4104 with the rules of other California ozone nonattainment air districts' rules. The results of the analysis are discussed below.

- South Coast Air Quality Management District (SCAQMD) Rule 472 (Reduction of Animal Matter) adopted May 7, 1976
- Bay Area Air Quality Management District (BAAQMD) Regulation 12 Rule 2 (Rendering Plants) adoption date not available
- Sacramento Metropolitan Air Quality Management Air District, Rule 410 (Reduction of Animal Matter) amended August 3, 1977
- Ventura County Air Pollution Control District Rule 58 ((Reduction of Animal Matter) amended May 23, 1972

**A. South Coast Air Quality Management District (SCAQMD) Rule 472 (Reduction of Animal Matter)**

SCAQMD Rule 472 prohibits the operation or use of any equipment for the reduction of animal matter unless all gases, vapors, and gas entrained effluents from such equipment are incinerated at temperatures of not less than 650° C (1202° F for a period of not less than 0.3 second, or processed in such a manner that is determined by the APCO to be equally or more effective than the conditions stated above.

District Rule 4104 requires an incineration temperature of 1200 °F compared to SCAQMD Rule 472 temperature of 1202 °F. However, District staff's review of the District Permit database indicates that permitted incineration equipment such as thermal oxidizer requires a temperature of 1400 °F for a period of no less than one second. Based on the above discussion, District staff deems that District Rule 4401 is as stringent as SCAQMD Rule 1108.

**B. Bay Area Air Quality Management District (BAAQMD) Regulation 12 Rule 2 (Rendering Plants)**

BAAQMD Regulation 12 Rule 2 requires the an incineration temperature 1202 °F and for a period of not less than 0.3 second, or processed in a manner which is equally or more effective for the purpose of air pollution odor control as determined by the APCO.

District Rule 4104 requires an incineration temperature of 1200 °F compared to BAAQMD Rule 472 temperature of 1202 °F. However, District staff's review of the District Permit database indicates that permitted incineration equipment such as thermal oxidizer requires a temperature of 1400 °F for a period of no less than one second. Based on the above discussion, District staff deems that District Rule 4104 is as stringent as BAAQMD Regulation 12 Rule 2.

**C. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 410 (Reduction of Animal Matter)**

SMAQMD Rule 410 requires the an incineration temperature 1202 ° F and for a period of not less than 0.3 second, or processed in a manner which is equally or more effective for the purpose of air pollution control as determined by the APCO.

District Rule 4104 requires an incineration temperature of 1200 ° F compared to SMAQMD Rule 410 temperature of 1202 °F. However, District staff's review of the District Permit database indicates that permitted incineration equipment such as thermal oxidizer requires a temperature of 1400 °F for a period of no less than one second. Based on the above discussion, District staff deems that District Rule 4104 is as stringent as SMAQMD Rule 410.

**D. Ventura County Air Pollution Control District (VCAPCD) Rule 58 (Reduction of Animal Matter)**

VCAPCD Rule 58 requires the an incineration temperature 1300 ° F for a period of not less than 0.4 second, or processed in a manner which is equally or more effective for the purpose of air pollution control as determined by the APCO.

District Rule 4104 requires an incineration temperature of 1200 ° F for a period of 0.3 second compared to VCAPCD Rule 58 temperature of 1300 ° F for a period of not less than 0.4 second. However, District staff's review of the District Permit database indicates that permitted incineration equipment such as thermal oxidizer requires a temperature of 1400 ° F for a period of no less than one second. Based on the above discussion, District staff deems that District Rule 4104 as stringent as stringent as VCAPCD Rule 58.

**Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4104 satisfies RACT for reduction of animal matter.

## Rule 4106 – Prescribed Burning and Hazard Reduction Burning

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	3.41	3.40	3.39	3.38	3.38	3.36	3.34	3.32
VOC	7.85	7.82	7.79	7.78	7.76	7.72	7.68	7.63

(Source: District 2007 Ozone Plan)

### District Rule 4106 Description

District Rule 4106 applies to prescribed burning and hazard reduction burning conducted within the San Joaquin Valley Air Basin. The purpose of this rule is to permit, regulate, and coordinate the use of prescribed burning and hazard reduction burning while minimizing smoke impacts to the public.

District Rule 4106 includes the following requirements and prohibitions

#### General Requirements

- Rule 4106 provides that regardless of the status of burn permits or burn plans, no prescribed or hazard reduction burning may occur at any location in the District unless it is within the allocation for the day for the region in which it is located and the burning has been authorized by the District.
- The APCO will allocate burning based on the predicted meteorological conditions and whether it would cause nuisance, impact smoke sensitive areas, or create or contribute to an exceedance of the ambient air quality standard.
- The APCO will restrict the time of day when burns are ignited and conducted.
- No prescribed burning or hazard reduction burning will be permitted that will create nuisance as defined in the state Health and Safety Code.
- All burning authorized pursuant to the rule shall be subject to any requirements, restrictions or prohibitions of the fire protection agency having jurisdiction over the burn site.

#### Prescribed Burning

- Ignition of a prescribed burn shall not occur on a no-burn day.
- Rule 4106 provides that planned burn projects be submitted annually or seasonally for registration. The annual registration would have to include areas being considered for potential naturally ignited wildland fires managed for resource benefits. Rule 4106 also describes the information that must be included in the annual registration of prescribed burning projects and includes provisions related to plan review and approval. The District must approve or disapprove the plan and/or provide comments on the elements of the smoke management section within 30 days or it will be deemed adequate and approved as submitted.

- Requires that any person responsible for conducting a prescribed burn greater than ten acres in size or projected to emit more than one ton of particulate matter take a smoke management class approved by the APCO.
- For a multi-day burn which may impact smoke sensitive areas, a land manager or his or her designee shall coordinate daily with the District or the ARB to affirm that the burn project remains within the conditions specified in the smoke management plan, or whether contingency plans must be implemented.

#### Smoke Management Plans

- Smoke Management Plans (SMPs) would be required for all prescribed burn projects.
- SMPs require progressively more detail as the acreage and/or projected emissions get larger.
- For projects less than 10 acres in size or projected to produce less than 1 ton of particulate matter a SMP must be submitted that includes:
  - A legal description of the burn, including maps,
  - A description of the type of fuels and the amount of fuels in tons or acres
  - The identity and mailing address of the responsible personnel, including telephone numbers for 24-hour contact.
- For projects larger than 10 acres but less than 100 acres in size a SMP must also include:
  - The distance and compass headings of smoke sensitive areas within five (5) miles including but not limited to schools, day care centers, hospitals, medical clinics, populated areas, highways.
  - A description of the wind speed and direction necessary for burning.
  - A description of the anticipated duration of project's smoke production from ignition to burn down.
- For projects larger than 100 acres but less than 250 acres in size a SMP must also include
  - A description of the meteorological conditions the land manager or his/her designee will use for making burn ignition decisions to limit smoke impacts to smoke sensitive areas.
  - A description of the smoke management criteria the land manager or his/her designee will use for making burn ignition decisions.
  - A description of the per acre fuel loading, including the fuel type, existing fuel loading in tons per acre, and anticipated fuel consumption. Describe the fuel expected to be consumed such as duff, fines, 1-, 10-, 100-, and/or 1000-hour fuels, live fuels, etc.
  - Identification of potential impacts to smoke sensitive areas as determined by mapping the daytime and nighttime smoke paths, including upslope and downslope and/or diurnal drainage flow, for a distance of twenty-five miles from the burn site.
  - Identification of the population located in the potential smoke sensitive areas.
  - A description of how the public will be informed of the possible effects of smoke and the duration of the effects. Include copies of public information planned for release.

- A description of the type and frequency of the surveillance and/or monitoring that will be conducted to determine any smoke impacts to smoke sensitive areas.
- a description of the specific smoke contingency actions that will be taken in the event smoke impacts occur in smoke sensitive areas or meteorological conditions deviate from those specified in the smoke management plan.
- a description of what post-burn Best Available Control Measures will be implemented to limit the duration of smoke impacts to smoke sensitive areas.
- For projects larger than 250 acres in size a SMP must also include
  - A description of the surveillance and air monitoring methods. Monitoring may be visual monitoring, ambient particulate monitoring or other monitoring approved by the District. The type of monitoring required for a specific burn project shall be determined in consultation with the District and a description of the monitoring shall be included in the smoke management plan for that project.
  - A description of the surveillance and air monitoring methods.
  - A description of the smoke complaint handling procedures.
  - A description of the decision making process that will be used in implementing smoke mitigations procedures.
  - A description of the responsive impact mitigations up to and including a declaration of a wildfire and aggressive fire suppression.
  - A post-burn smoke management evaluation.

#### Naturally Ignited Fires

- Naturally ignited wildland fires occurring on a “no-burn” day shall not be allowed to continue as a prescribed burn unless, after consultation, the District decides, for smoke management purposes, that the burn can be managed for resource benefits.
- If a naturally ignited wildland fire is allowed to continue for resource benefits, smoke management plans are required within 72 hours of the start of the fire.

#### Hazard Reduction Burning

- No person shall knowingly set or permit hazard reduction burning unless they have a valid Permit by the APCO or his designee.
- No vegetation shall be burned unless it is described on a valid Permit.
- The vegetation shall be in a condition that will facilitate combustion and minimize the amount of smoke emitted during combustion.
- Vegetation to be burned shall be ignited only with an APCO approved ignition device.
- Vegetation shall not be burned unless it is free of excessive dirt, soil, and moisture.
- Vegetation shall not be burned unless it is arranged or loosely stacked in such a manner as to promote drying and insure combustion with a minimum of smoke production.
- A Permit shall be valid only on those days during which burning is not prohibited by the ARB, by the District or by the designated agency having jurisdiction over

the site of the proposed burning pursuant to section 41855 of the California Health and Safety Code and the District has authorized the burning as being within the day's burn system allocation for the region in which the burn site is located.

**How does District Rule 4106 compare with federal rules and regulations?**

**A. EPA – Control Technique Guidelines (CTG)**

District staff's review of the EPA CTG list indicates that there is no CTG for prescribed burning or hazard reduction burning.

**B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for prescribed burning or hazard reduction burning.

**C. Standards of Performance for New Stationary Sources (NSPS)**

District staff's review of 40 CFR 60 (Standards of Performance for New Sources) indicates that there is no NSPS for prescribed burning or hazard reduction burning.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

District staff's review of 40 CFR 61 (NESHAP) and 40 CFR (NESHAP for Source Categories) indicates that there is no NESHAP or MACT for prescribed burning or hazard reduction burning.

**How does District Rule 4106 compare to rules in other air districts?**

District staff compared District Rule 4106 with the rules of other California ozone nonattainment air districts' rules on prescribed burning or hazard reduction burning. The results of the analysis are discussed below.

- South Coast Air Quality Management District Rule 444 (Open Burning) amended December 21, 2001
- Bay Area Air Quality Management District Regulation 5 (Open Burning) amended November 2, 1994
- Sacramento Metropolitan Air Quality Management Air District Rule 501 (Agricultural Burning) amended April 3, 1997
- Ventura County Air Pollution Control District) Rule 56 (Open Burning) amended November 11, 2003

**A. South Coast AQMD Rule 444 (Open Burning)**

SCAQMD Rule 444 applies to open burning, burning of agricultural waste, disposal of Russian thistle, prescribed burning, fire prevention/suppression training, open detonation or use of pyrotechnics, fire hazard, disposal of infectious wastes (other than hospital waste), research and testing materials equipment or techniques, disposal of contraband, and residential burning.

SCAQMD Rule 444 prohibits open burning unless:

- The executive officer has declared the day as a permissive burn day and such burning is not prohibited by a public fire protection agency.
- A written permit and an authorization are obtained from the executive for each day of prescribed burning or hazard reduction burning.

SCAQMD Rule 444 allows open burning for:

- Agricultural burning;
- Prescribed burning;
- Disposal of Russian thistle;
- Fire hazard abatement that a fire protection agency determines cannot be abated by any viable option;
- Disposal of waste infected with agricultural pest or disease and ordered by the county agricultural commissioner;
- Disposal of infectious waste (other than hospital waste) ordered by the county health officer;
- Use of pyrotechnics for creation of special effects in motion pictures, etc.;
- Disposal of contraband in the possession of law enforcement personnel provided burning is the only available reasonable method for safe disposal; and
- Fire prevention training; and researching and testing fire retardant properties of materials, etc.

SCAQMD Rule 444 prohibits open burning for

- Residential burning;
- Disposal of waste except as mentioned above;
- Materials generated as a result of land use conversion for non-agricultural purposes;
- Disposal of materials from the production or storage of military ordnance, etc.; and
- Wildland suppression fires except those set by fire protection agencies to save life and property.

SCAQMD Rule 444 requires prescribed burning or hazard reduction burning to comply with the following:

- Prescribed burning shall not be conducted until a burn implementation plan is approved in writing by the Executive Officer.
- A person shall conduct or allow prescribed burning only when the fires are set by, under the jurisdiction of, or pursuant to the orders or requirements of a fire protection agency.



- Prior to conducting or allowing prescribed burning for any project greater than 10 acres or that produces more than one ton of particulate matter emissions, as determined using EPA AP-42 or equivalent emissions factors approved by the Executive Officer, CARB, and EPA, a person shall have a Smoke Management Plan approved in writing by the Executive Officer. At a minimum, the Smoke Management Plan shall contain the following information:
  - location, types, and amounts of material to be burned;
  - expected duration of the fire from ignition to extinction;
  - identification of responsible personnel, including telephone contacts;
  - identification and location of all smoke sensitive areas; and
  - where the particulate emissions tonnage is selected as the criteria for determining the project size, calculation of the particulate emissions tonnage.
- Prior to conducting or allowing prescribed burning for any project greater than 100 acres or that produces more than 10 tons of particulate matter emissions, as determined using EPA AP-42 or equivalent emissions factors approved by the Executive Officer, CARB, and EPA, a person shall have a Smoke Management Plan approved in writing by the Executive Officer. At a minimum, the Smoke Management Plan shall contain the information required for 10-100 acre burns and the following information:
  - Identification of meteorological conditions necessary for burning
  - The smoke management criteria the land manager will use for making burn ignition decisions
  - Projections, including a map, of where the smoke from burns are expected to travel both day and night
  - Specific contingency actions (such as fire suppression or containment) that will be taken if smoke impacts occur or meteorological conditions deviate from those specified in the smoke management plan
  - An evaluation of and consideration of economically, and logistically viable alternatives to burning
  - Discussion of public notification procedures.
- The Executive Officer shall prioritize burn authorization requests based upon:
  - the burner's demonstrated level of training identified in the burn implementation and smoke management plans
  - the measures identified in the smoke management plan proposed to reduce emissions.
- The Executive Officer may allow prescribed burning on marginal burn days provided a smoke management plan has been approved and the predicted daily maximum hourly average ozone concentration in the source receptor area of the prescribed burn meets the California 1-hour ozone standard.

SCAQMD Rule 444 specifies that the executive officer may allow the certain specified maximum daily burn acreage for agricultural burning and prescribed burning as follows:

- Except for Coachella Valley, 150 acres for prescribed wildland and range burning, and 150 acres for agricultural burning.
- For Coachella Valley, 5 acres for prescribed wildland and range burning and 35 acres for agricultural burning.

- The above restrictions do not apply to prescribed burning when a land manager demonstrates that it is required to reduce fire hazard that jeopardized public health and safety and a satisfactory smoke management plan is submitted and approved by the air district.

SCAQMD Rule 444 exempts the following;

- Wildfire suppression ignited to save life and valuable property conducted by fire protection agency.
- Fire prevention/suppression training, except for the burning of existing structure, conducted by fire protection agency for no more than 30 minutes. Training involving burning of existing structure is exempt provided each training is no more than 30 minutes.
- Burning of Russian thistle is exempt from having to get authorization from the district.
- Recreational fires or ceremonial fires.
- Open burning of natural gas, propane, untreated wood, or charcoal for the purpose of preparation or warming of food for human consumption or generating warmth for social gathering.
- Open burning located on islands 15 miles or more from the mainland coast.
- Fireworks displays or pyrotechnics used for the creation of special effects at theme parks.
- Detonation of explosives during quarry mining operations, bomb disposal by law enforcement agency, or demolition of buildings or structures.
- Pyrotechnics, detonation of explosives, or fire effects for creation of special effects during theatrical productions, filming of motion pictures, videotaping of television programs or other commercial filming or video production activities must not be more than 30 minutes in duration.

SCAQMD Rule 444 applies to a variety of open burning activities which includes prescribed burning and hazard reduction burning which are not regulated by District Rule 4106, but are regulated by District 4103 (Open Burning).

Overall, District Rule 4106 is more stringent than SCAQMD Rule 444 for the following major reasons:

- District Rule 4106 requires SMPs for prescribed fires less than 10 acres. SCAQMD Rule 444 has no similar restrictions.
- District Rule 4106 has SMP requirements for prescribed fires larger than 100 acres that SCAQMD Rule 444 does not, including:
  - A description of the per acre fuel loading
  - Identification of potential impacts to smoke sensitive areas for a distance of twenty-five miles from the burn site.
  - Identification of the population located in the potential smoke sensitive areas.
  - A description of how the public will be informed of the possible effects of smoke and the duration of the effects. Include copies of public information planned for release.

- A description of the type and frequency of the surveillance and/or monitoring that will be conducted to determine any smoke impacts to smoke sensitive areas.
- a description of the specific smoke contingency actions that will be taken in the event smoke impacts occur in smoke sensitive areas or meteorological conditions deviate from those specified in the smoke management plan.
- a description of what post-burn Best Available Control Measures will be implemented to limit the duration of smoke impacts to smoke sensitive areas
- Rule 4106 provides that planned burn projects be submitted annually or seasonally for registration. The annual registration would have to include areas being considered for potential naturally ignited wildland fires managed for resource benefits. Rule 4106 also describes the information that must be included in the annual registration of prescribed burning projects and includes provisions related to plan review and approval. The District must approve or disapprove the plan and/or provide comments on the elements of the smoke management section within 30 days or it will be deemed adequate and approved as submitted. SCAQMD Rule 444 has no similar restrictions.
- District Rule 4106 requires that any person responsible for conducting a prescribed burn greater than ten acres in size or projected to emit more than one ton of particulate matter take a smoke management class approved by the APCO. SCAQMD Rule 444 has no similar restrictions.
- SCAQMD is more stringent than District Rule 4106 because it establishes maximum daily burn acreage for agricultural burning and prescribed burning. However, these limits can be if a land manager demonstrates that it is required to reduce fire hazard that jeopardized public health and safety and a satisfactory smoke management plan is submitted and approved by the air district.

Based on the above discussion, District staff deems that additional SMP, planning, and training requirements in District Rule 4106 make it more stringent than SCAQMD Rule 444.

## **B. Bay Area AQMD Regulation 5 (Open Burning)**

BAAQMD Regulation 5 applies to open burning of agricultural waste, range management, forest management, and wildland management. The rule prohibits a person from igniting, causing to ignite, permit to be ignited, or suffer, allow, or maintain fires within the district. No burning should take place in the district on other than a permissive burn day.

BAAQMD Regulation 5 allows the following fires on permissive burn days:

- Disease and pests prevention;
- Crop replacement;
- Orchard pruning and attrition;
- Double cropping stubble;
- Hazardous materials (prevention or reduction of fire hazard, disposal of dangerous materials);
- Fire training;

- Flood debris;
- Control growth of vegetation from irrigation ditches and canals;
- Disposal of material which is lying or growing within natural channels or flood control channels;
- Fires set for the purpose of range management and grazing;
- Fires set for the purpose of removing forest debris and for forest management;
- Fires set for the purpose of improvement of lowland and marsh for wildlife and game habitat;
- Fires set for the purpose of disposing contraband;
- Prescribed burning by state or federal agency, or through cooperative agreement or contract involving state or federal agency.
- Fires set as part of commercial film or video production activities for motion picture and television.
- Fires set as part of a planned civic event designed to educate or otherwise benefit the public.

BAAQMD Regulation 5 requires that any person conducting prescribed burning that is allowed by the rules must also comply with the following:

- Effective June 1, 2002, fires may not be conducted on other than a permissive burn day.
- A smoke management plan must be submitted to the APCO for review at least 30 calendar days prior to the proposed burning that is consistent with the most current USEPA guidance on wildland and prescribed fires (Interim Air Quality Policy on Wildland and Prescribed Fires, USEPA 1998, or any subsequent document that supersedes this document), and provides the following information:
  - Location and specific objectives of each proposed burn
  - Acreage, tonnage, type, and arrangement of vegetation to be burned
  - Directions and distances to nearby sensitive receptor areas
  - Fuel condition, combustion and meteorological prescription elements for the project
  - projected burn schedule and expected duration of project ignition, combustion, and burn down (hours or days)
  - specifications for monitoring and of verifying critical parameters
  - including meteorological conditions and smoke behavior before and during the burn
  - specifications for disseminating project information to public
  - contingency actions that will be taken during the burn to reduce exposure if smoke intrusions impact any sensitive receptor area
  - certification by a qualified professional resource ecologist, biologist, or forester that the proposed burning is necessary to achieve the specific management objective(s) of the plan
  - a copy of the environmental impact analysis prepared for the plan that includes an evaluation of alternatives to burning, if such an analysis was required by state or federal law or statute
  - project fuel loading estimate (tons vegetation/acre) by vegetation
  - type(s) and a description of the calculation method

- particulate matter emissions estimate including referenced emission factor(s) and a description of the calculation method used
- Permission to burn shall be governed by the acreage burning allocation issued by the APCO.
- For each day on which burning occurs, report the total acreage and tonnage of vegetation actually burned to the APCO by telephone no later than 12:00 p.m. local time the following day.
- Within 30 calendar days following completion of the burn project, provide a written post-burn evaluation to the APCO that addresses whether the project objectives were met and describes actual smoke behavior.
- Any fire official seeking to conduct prescribed burning in a geographical area considered for a potential naturally-ignited wildland fire managed for resource benefits that is expected to exceed 10 acres in size shall annually register each burn project in writing with the APCO by December 31 each year, with updates as they occur. Once a decision is made to manage the fire for resource benefits, the fire official shall provide a smoke management plan for the burn project to the APCO, upon request.

BAAQMD Regulation 5 requires that any person conducting hazard reduction burning that is allowed by the rules must also comply with the following:

- The person setting the fire shall provide electronic, typewritten, legibly handwritten, or computer printed notification to the District prior to the burn on a District-approved form or facsimile thereof.
- The fire must be set or allowed by any public fire official having jurisdiction, in the performance of official duty.
- The fire must, in the opinion of such officer, be necessary, and the fire hazard not able to be abated by any other means.
- No fires involving piled material shall be ignited or take place before 9:30 a.m. local time on any day.

BAAQMD Regulation 5 applies to a variety of open burning activities which includes activities which are not regulated by District Rule 4106, but are regulated by District Rule 4103 (Open Burning).

Overall, District Rule 4106 is more stringent than BAAQMD Regulation 5 for the following major reasons:

- District Rule 4106 requires that no person shall knowingly set or permit hazard reduction burning unless they have a valid Permit by the APCO or his designee. BAAQMD Regulation 5 requires that the person setting the fire notify the District of a pending burn and keep a personal record of burning activities.
- Ignition of a prescribed burn shall not occur on a no-burn day under District Rule 4106. BAAQMD Regulation 5 contains no such restrictions.
- District Rule 4106 requires that any person responsible for conducting a prescribed burn greater than ten acres in size or projected to emit more than one ton of particulate matter take a smoke management class approved by the APCO. BAAQMD Regulation 5 has no similar requirement.

- BAAQMD Regulation 5 has the same requirements for all Smoke Management Plans, regardless of fire size. For smaller fires (less than 100 acres) Regulation 5's SMP requirements are stricter than District Rule 4106. However, for larger fires (over 100 acres) District Rule 4106 has more stringent requirements for SMPs.

Based on the above discussion, District staff deems that District Rule 4106 is overall more stringent than BAAQMD Regulation 5.

### **C. Sac Metro AQMD Rule 501 (Agricultural Burning)**

SMAQMD Rule 501 applies agricultural open outdoor fires. Non-agricultural burning is regulated under SMAQMD Rule 407 (Open Burning).

SMAQMD Rule 501 prohibits the following:

- Burning of petroleum waste, demolition waste, tires, trees, wood waste, or other combustible or flammable solid or liquid waste, motor vehicle bodies, materials for the purpose of metal salvage, putrescible materials, bedding, asphaltic products, or rubber products.
- Burning or allowing to be burned, or maintaining any open outdoor fire for the purpose of burning refuse or organic waste on an agricultural no-burn day.
- Burning or allowing to be burned, or maintaining any open outdoor fire for the purpose of burning refuse or organic waste at any time at certain locations specific in the rule.

SMAQMD Rule 501 contains the following specific standards for prescribed burning:

- Vegetation to be burned shall be in a condition that will facilitate combustion and minimize the amount of smoke emitted during combustion.
- For wild land vegetation management burning projects exceeding 10 acres in size, the following information—in addition to the information set forth in the burning permit application—shall be provided to the designated agency for review and approval 30 days in advance of the proposed burning:
  - The location and specific objectives of the burn project
  - The acreage or tonnage, type and arrangement of wild land vegetation to be burned
  - The directions and distances to nearby sensitive receptor areas
  - The fuel condition, combustion, and meteorological prescription elements developed for the burn
  - The projected schedule and duration of project ignition, combustion, and burn down
  - The specifications for monitoring and verifying critical project parameters
  - The specifications for disseminating project information—i.e., notification of the public, the designated agency, the fire protection agency having jurisdiction, and other affected agencies of the time, date, location, and acreage of the proposed burn.

Overall, District Rule 4106 is more stringent than SMAQMD Rule 501 for the following major reasons:

- District Rule 4106 prohibits prescribed burning or hazard reduction burning of almost all agricultural wastes, except prunings from apples crops, pears crops, fig crops, and quince crops, as well as weed abatement activities affecting waterways for which prescribed burning or hazard reduction burning is allowed until June 1, 2010. District Rule 4106 allows prescribed burning or hazard reduction burning of orchard removal from citrus, apple, pear, quince, fig crops and orchard removal of up to 20 acres per location per calendar year until June 1, 2010, the burning of rice straw until June 1, 2015. SMAQMD Rule 501 allows prescribed burning or hazard reduction burning of agricultural waste.
- Unlike District Rule 4106, SMAQMD Rule 501 does not require submission of burn plans or obtaining burn permits prior to igniting a hazard reduction burn.
- Unlike District Rule 4106, SMAQMD Rule 501 does not allocate burning based on the predicted meteorological conditions and whether it would cause nuisance, impact smoke sensitive areas, or create or contribute to an exceedance of the ambient air quality standard.
- Unlike District Rule 4106, SMAQMD Rule 501 does not restrict the time of day when burns are ignited and conducted.
- Unlike District Rule 4106, SMAQMD Rule 501 does not require Smoke Management Plans for burns less than 10 acres.
- Unlike District Rule 4106, SMAQMD Rule 501 does not have more stringent Smoke Management Plan requirements for burns over 100 acres.

Based on the above discussion, District staff deems that District Rule 4106 is more stringent than SMAQMD Rule 501.

#### **D. Ventura County APCD Rule 56 (Open Burning)**

VCAPCD Rule 56 applies to the burning of combustible materials in open outdoor fires. The rule allows open burning provided the following requirements are met:

- A valid burn permit must be obtained prior to burning.
- Open burning is allowed only on days declared to be Burn Days by the APCO.
- Open burning is allowed for disposal of agricultural waste in the pursuit of agricultural operations, range improvement, wildland vegetation management, levee, reservoir or ditch maintenance, and disposal of Russian thistle.
- Burn only plant material that grew on property where the burn is conducted, or on another property of the same grower if approved by APCO.
- Material to be burned should be reasonably free from dirt, soil and visible moisture.
- Material to be burned should sufficiently dry (except for prescribed burning) for the minimum time period specified in the rule.
- Material to be burned should be stacked or arranged to allow maximum air circulation to minimize smoke during combustion.
- Use only ignition device approved by the APCO or the fire protection agency, and should be ignited as rapidly as practicable within fire control restrictions.

- Conduct open burning when wind speed and direction will not carry emissions into smoke sensitive areas.
- Conduct burning during time periods specified in the rule.
- The amount, timing, and location of all open burning will be restricted by the district to minimize smoke impacts on smoke sensitive areas.

VCAPCD Rule 56 includes specific requirements for prescribed burning and range improvement burning, including:

- The vegetation to be burned shall be in a condition that will facilitate combustion and minimize the amount of smoke emitted during combustion.
- Burning at night and multi-day burns shall be minimized whenever practicable.
- For range improvement burning conducted primarily for improvement of land for wildlife and game habitat, the applicant shall file with the APCD a statement from the Department of Fish and Game certifying that burning is desirable and proper. The Department of Fish and Game may specify the amount of brush treatment required, along with any other conditions it deems appropriate.
- The land manager or his/her designee shall register all planned burn projects annually or seasonally with the APCD, including areas considered for potential naturally-ignited wildland fires managed for resource benefits, with updates as they occur.
- The land manager or his/her designee must receive authorization to burn from the APCD the business day prior to burning.
- Prior to ignition on the day of the burn, the land manager or his/her designee shall confirm with the APCD that all conditions and all requirements stated in the smoke management plan are met.
- When a natural ignition occurs on a No Burn Day, the initial "go/no-go" decision by the land manager to manage the fire for resource benefit will be "no-go" unless, after consultation with the APCD or ARB, the APCD or ARB concurs, for smoke management purposes, that the burn can be managed for resource benefit. A "no-go" decision does not necessarily mean that the fire must be extinguished, but that the fire cannot be considered prescribed burning.
- For naturally-ignited wildland fires managed for resource benefits that are expected to exceed 10 acres in size, the land manager or his/her designee shall submit a smoke management plan no later than 72 hours after the start of the fire.
- For fires greater than 250 acres, the land manager or his/her designee, shall submit a post-burn smoke management evaluation to the APCD no later than 30 days after completion of the burn.
- Smoke Management Plans are required for burns over 10 acres and must include:
  - The location and the specific objectives of the burn.
  - The acreage or tonnage, type and arrangement of the vegetation to be burned.
  - The distances and directions to all potentially affected smoke sensitive areas.
  - The fuel condition, combustion and meteorological prescription elements developed for the project.
  - The project schedule and duration of project ignition, combustion and burndown.



- Specifications for monitoring and verifying critical parameters such as air quality or weather.
- A discussion of how the requirements of Section B of this Rule that apply to prescribed burning will be satisfied.
- A discussion of what specific contingency actions (such as fire suppression or containment) will be taken if unanticipated conditions cause smoke to create or contribute to an exceedance of a state or federal ambient air quality standard or cause a public nuisance.
- A discussion of the procedure that the land manager or his/her designee will use to coordinate daily with the APCD on multi-day burns, which may impact smoke sensitive areas, to affirm that the burn project remains within the conditions specified in the Plan, or whether contingency actions are necessary.
- Specifications and procedures for disseminating project information to the public.
- Procedures for public notification and education, including appropriate signage at burn sites, and for reporting any public smoke complaints to the APCD.
- Identification of responsible personnel, including 24-hour telephone contacts for on-site personnel responsible for the burn.
- The smoke management criteria the land manager or his/her designee will use for making burn ignition decisions.
- Projections, including a map, of where the smoke is expected to travel, both day and night.
- An evaluation of alternatives to burning considered. If an analysis of alternatives has been prepared as part of the environmental documentation required for the burn project pursuant to the National Environmental Policy Act or the California Environmental Quality Act, as applicable, the analysis shall be attached to the smoke management plan to satisfy this requirement.

Overall, District Rule 4106 is more stringent than VCAPCD Rule 56 because District Rule 4106 prohibits open burning of almost all agricultural wastes, except prunings from apples crops, pears crops, fig crops, and quince crops, as well as weed abatement activities affecting waterways for which open burning is allowed until June 1, 2010. District Rule 4106 allows open burning of orchard removal from citrus, apple, pear, quince, fig crops and orchard removal of up to 20 acres per location per calendar year until June 1, 2010, the burning of rice straw until June 1, 2015. VCAPCD Rule 56 allows open burning of any agricultural waste.

VCAPCD Rule 56 and District Rule 4106 have comparable requirements for naturally ignited fires and prescribed fires.

Based on the above discussion, District staff deems that District Rule 4106 is more stringent than VCAPCD Rule 56.

## **Conclusion**

There are no federal rules and regulations that apply to prescribed burning or hazard reduction burning. After careful evaluation the prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4106 satisfies RACT for prescribed or hazard reduction burning.

## Rule 4301 – Fuel Burning Equipment

### Emissions Inventory:

Tons per day – summer season

Pollutant	2002	2004	2006	2008	2012	2016	2020	2024
NOx	89.157	90.311	83.046	79.302	79.944	80.452	80.574	79.188

(Source: District 2007 Ozone Plan)

### District Rule 4301 Description

This rule was originally enacted by California Air Resources Board (CARB) in the early 1970s. The rule was delegated to all air districts in California soon thereafter.

This rule limits the concentration of combustion contaminants to 0.1 grain per standard cubic feet of gas and limits maximum emissions rates of sulfur dioxide to 200 pounds per hour, nitrogen oxide to 140 pounds per hour, and combustion contaminants to 10 pounds per hour from fuel burning equipment.

### How does District Rule 4301 compare with federal rules and regulations?

#### **A. EPA - Control Techniques Guidelines**

There is no CTG for this source category.

#### **B. EPA - Alternative Control Techniques Guidelines**

*NOx Emissions from Process Heaters - EPA-453/R-93-034*

*NO<sub>x</sub> Emissions from Utility Boilers - EPA-453/R-94-023*

*NOx Emissions from Industrial/Commercial/Institutional Boilers - EPA-453/R-94-022*

These documents outline the NOx control techniques used in controlling emissions from boilers and process heaters; such as low-NOx burners (LNB's), ultra-low NOx burners (ULNBs), selective non-catalytic reduction (SNCR), selective catalytic reduction (SCR) and flue gas recirculation (FGR).

The reduction efficiency of each control technique varies depending on the application and design. The control efficiencies for LNB, ULNB, and SCR are considered to be representative averages based on operating experience, range from 27% for LNB to 92% for LNB plus SCR.

This rule was the very first rule to limit NOx from process heaters and boilers or similar equipment used in process of burning fuel for primary purpose of producing heat or power by indirect heat transfer before many of the above technologies were developed.

Rule limits NO<sub>x</sub> emissions to 140 lb/hr regardless of control technique or technology, equipment design, application, size or rating. Much lower emissions can reasonably be achieved using control techniques described above.

However, District's permits database search determined that all permit units to which NO<sub>x</sub> requirements of rule 4301 apply, have been subject to the following SIP approved rules that supersede the NO<sub>x</sub> requirements of this rule.

The following District rules have been determined by EPA to fulfill Best Available Control Measures (BACM) required for serious nonattainment areas per Section 189(b) of Clean Air Act as well RACT required for moderate nonattainment areas per Section 189(a) of Clean Air Act.

Rule 4306 - BOILERS, STEAM GENERATORS AND PROCESS HEATERS

Rule 4307 - BOILERS, STEAM GENERATORS, AND PROCESS HEATERS - 2.0 MMBTU/HR TO 5.0 MMBTU/HR

Rule 4308 - BOILERS, STEAM GENERATORS, AND PROCESS HEATERS (0.075 MMBTU/HR TO 2.0 MMBTU/HR)

Rule 4309 - DRYERS, DEHYDRATORS AND OVENS

Rule 4352 - SOLID FUEL FIRED BOILERS, STEAM GENERATORS, AND PROCESS HEATERS

### **How does Rule 4301 compare to rules in other air districts**

District staff compared NO<sub>x</sub> limits, optional control requirements, and work practice standards in District Rule 4301 to comparable requirements in rules from the following California nonattainment areas:

- South Coast Air Quality Management District Rule 474 (Fuel Burning Equipment - Oxides of Nitrogen)
- Bay Area Air Quality Management District Regulation 9 Rule 6 (Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heater) and Regulation 9 Rule 7 (Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)
- Sacramento Metropolitan Air Pollution Control District Rule 411
- Ventura County Air Pollution Control District Rule 60

#### **A. South Coast AQMD Rule 474**

South Coast AQMD Rule 474 allows NO<sub>x</sub> emissions that range from 125 ppmv to 400 ppmv @ 3% O<sub>2</sub>.

**B. Bay Area AQMD**

Bay Area Air Quality Management District does not have any rule that is similar to District Rule 4301. However it has following rules that were determined by EPA to fulfill Best Available Control Measures (BACM) required for serious nonattainment areas per Section 189(b) of Clean Air Act as well RACT required for moderate nonattainment areas per Section 189(a) of Clean Air Act.

**Rule 9-6 Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters**

This rule applies to equipment with heat input rating between 0.75 MMBtu/hr and 2.0 MMBtu/hr. Allowable NOx emissions range from 20 ppmv to 55 ppmv @ 3% O<sub>2</sub>.

**Rule 9-7 Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters**

This rule applies to equipment with heat input rating greater than 2.0 MMBtu/hr. Allowable NOx emissions range from 5 ppmv to 30 ppmv @ 3% O<sub>2</sub>.

**C. Sac Metro AQMD Rule 411**

Sacramento Metropolitan Air Quality Management District does not have any rule that is similar to District Rule 4301. However it has following rule that was determined by EPA to fulfill Best Available Control Measures (BACM) required for serious nonattainment areas per Section 189(b) of Clean Air Act as well RACT required for moderate nonattainment areas per Section 189(a) of Clean Air Act.

**Rule 411 NOx from Boilers, Process Heaters and Steam Generators**

This rule applies to equipment with heat input rating greater than 1.0 MMBtu/hr. Allowable NOx emissions range from 9 ppmv to 30 ppmv @ 3% O<sub>2</sub>.

**D. Ventura County APCD Rule 60**

Ventura County Air Pollution Control District Rule 60 (New Non-Mobile Equipment - Sulfur Dioxide, Nitrogen Oxides, and Particulate Matter) limits maximum emissions rates of nitrogen oxide to 140 pounds per hour from fuel burning equipment.

**Conclusion**

District staff has determined that Rule 4301 itself can not be considered to fulfill the Reasonably Available Control Technology. However District staff concludes that NOx requirements of District Rule 4301 have been superseded by requirements of other District Rule that satisfy RACT for fuel burning equipment, since all units subject to Rule 4301 are subject to a more specific NOx rule, discussed elsewhere.

## Rule 4306 – Boilers, Steam Generators, and Process Heaters, >5 MMBtu/hr

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	7.5	4.7	4.6	4.6	4.7	4.7	5.2	5.4
VOC	0.7	0.7	0.7	0.71	0.71	0.73	0.75	0.77

(Source: District 2007 Ozone Plan)

The emissions inventory for large boilers (> 5.0 MMBtu/hr) is assumed to be included as part of the inventory for District Rule 4306 (large boilers - from units rated at 5 MMBtu/hr or less); above are the baseline emissions from boilers as a whole.

(Note: All Rule 4306 units are also subject to Rule 4320, which is more stringent)

### District Rule 4306 Description

District Rule 4306, was adopted September 18, 2003, and was most recently amended October 16, 2008. The purpose of Rule 4306 is to limit NOx and CO emissions from boilers, steam generators, and process heaters. The rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, and process heater with a rated heat input of 5.0 million Btu/hr or greater. This source category includes a wide range of industries including but not limited to medical facilities, educational institutions, office buildings, prisons, military facilities, hotels and industrial industries.

Units subject to Rule 4306 are to be certified that they comply with the following NOx and CO emission limits:

Rule 4306 NOx and CO Limits

Category	Operated on Gaseous Fuel			Operated on Liquid Fuel	
	NOx Limit		CO Limit (ppmv)	NOx Limit	CO Limit (ppmv)
	Standard Option	Enhanced Option			
A. Units with a rated heat input equal to or less than 20.0 MMBtu/hour, except for Categories C, D, E, F, G, H, and I units	15 ppmv or 0.018 lb/MMBtu	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
B. Units with a rated heat input greater than 20.0 MMBtu/hour, except for Categories C, D, E, F, G, H, and I units	9 ppmv or 0.011 lb/MMBtu	6 ppmv or 0.007 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400

<b>C. Oilfield Steam Generators</b>	15 ppmv or 0.018 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
D. Refinery units with a rated heat input greater than 5 MMBtu/hr up to 65 MMBtu/hr	30 ppmv or 0.036 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
E. Refinery units with a rated heat input greater than 65 MMBtu/hr up to 110 MMBtu/hr	25 ppmv or 0.031 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
F. Refinery units with a rated heat input greater than 110 MMBtu/hr	5 ppmv or 0.0062 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400
G. Load-following units	15 ppmv or 0.018 lb/MMBtu	9 ppmv or 0.011 lb/MMBtu	400	40 ppmv or 0.052 lb/MMBtu	400
H. Units limited by a Permit to Operate to an annual heat input of 9 billion Btu/year to 30 billion Btu/year	30 ppmv or 0.036 lb/MMBtu	No option	400	40 ppmv or 0.052 lb/MMBtu	400

### **How does District Rule 4306 compare with federal rules and regulations?**

District staff conducted a rule consistency analysis as part of the recent amendments to Rule 4306. This analysis was included with the SIP submittal as Appendix E of the staff report. The purpose of this document was to compare the amended rule to federal rules, regulations and policies.

This analysis determined that Rule 4306 met or exceeded the following federal requirements:

- 40 CFR 60 Subpart D (Standards of Performance for Fossil-Fuel Fired Steam Generators for Which Construction Commenced After August 17, 1971)
- 40 CFR 60 Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units)
- 40 CFR 60 Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units)
- 40 CFR 63 Subpart DDDDD (NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters)
- EPA –453/R-94-022 “Alternative Control Techniques (ACT) Document – NOx Emissions from Industrial/Commercial/Institutional Boilers”, dated March 1994
- EPA “Control Techniques Guideline (CTG) Document
- EPA Policy on Start-up or Shutdown

- EPA Policy on Recordkeeping
- EPA Policy on Representative Unit Testing
- EPA Policy on Alternate Emission Control Plan (AECp)

### **How does District Rule 4306 compare to rules in other air districts?**

The recent amendments to Rule 4306 strengthened emission limits and removed any exemptions which may have prevented the rule from satisfying RACT. Due to the overall stringency of recently amended Rule 4306, the District did not conduct a detailed comparison to rules in other air districts.

### **Conclusion**

District staff concludes that District Rule 4306 satisfies RACT for Boilers, Steam Generators, and Process Heaters – 5.0 MMBtu/hr or greater.



## Rule 4307 – Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	7.5	4.7	4.6	4.6	4.7	4.7	5.2	5.4
VOC	0.7	0.7	0.7	0.71	0.71	0.73	0.75	0.77

(Source: District 2007 Ozone Plan)

The emissions inventory for medium size boilers (2.0 to 5.0 MMBtu/hr) is assumed to be included as part of the inventory for District Rule 4306 (large boilers - from units rated at 5 MMBtu/hr or greater); above are the baseline emissions from boilers as a whole.

### District Rule 4307 Description

Rule 4307 was adopted by the District's Governing Board on December 15, 2005, and was most recently amended October 16, 2008. The purpose of Rule 4307 is to limit NOx and CO emissions from boilers, steam generators, and process heaters. The rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, and process heater with a rated heat input of 2.0 million Btu/hr up to and including 5.0 million Btu/hr. This source category includes a wide range of industries including but not limited to medical facilities, educational institutions, office buildings, prisons, military facilities, hotels and industrial industries.

Units subject to Rule 4307 are to be certified that they comply with the NOx and CO emission limits specified in the rule. For gaseous fuel-fired units the NOx limit is 30 ppmv or 0.036 lb/MMBtu and 400 ppmv for CO. For liquid fuel-fired units the NOx limit is 40 ppmv or 0.052 lb/MMBtu and 400 ppmv for CO. The most recent amendments to Rule 4307 removed established lower NOx limits for new and replacement units (12 ppmv or 0.014 lb/MMBtu) and eliminated the exemption associated with units that are used at schools. The rule also limits emissions SO<sub>2</sub>, and PM<sub>10</sub> from boilers, steam generators, and process heaters.

### How does District Rule 4307 compare with federal rules and regulations?

District staff conducted a rule consistency analysis as part of the recent amendments to Rule 4307. This analysis was included with the SIP submittal as Appendix E of the staff report. The purpose of this document was to compare the amended rule to federal rules, regulations and policies.

This analysis determined that Rule 4307 met or exceeded the following federal requirements:

- 40 CFR 60 Subpart D (Standards of Performance for Fossil-Fuel Fired Steam Generators for Which Construction Commenced After August 17, 1971)
- 40 CFR 60 Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units)
- 40 CFR 60 Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units)
- 40 CFR 63 Subpart DDDDD (NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters)
- EPA –453/R-94-022 “Alternative Control Techniques (ACT) Document – NOx Emissions from Industrial/Commercial/Institutional Boilers”, dated March 1994
- EPA “Control Techniques Guideline (CTG) Document
- EPA Policy on Start-up or Shutdown
- EPA Policy on Recordkeeping
- EPA Policy on Representative Unit Testing
- EPA Policy on Alternate Emission Control Plan (AECPP)

### **How does District Rule 4307 compare to rules in other air districts?**

The recent amendments to Rule 4307 strengthened emission limits and removed any exemptions which may have prevented the rule from satisfying RACT. Due to the overall stringency of recently amended Rule 4307, the District did not conduct a detailed comparison to rules in other air districts.

### **Conclusion**

District staff concludes that District Rule 4307 satisfies RACT for Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr.

## Rule 4308 – Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/hr to 2.0 MMBtu/hr

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	7.5	4.7	4.6	4.6	4.7	4.7	5.2	5.4
VOC	0.7	0.7	0.7	0.71	0.71	0.73	0.75	0.77

(Source: District 2007 Ozone Plan)

The emissions inventory for small size boilers (0.75 to 2.0 MMBtu/hr) is assumed to be included as part of the inventory for District Rule 4306 (large boilers - from units rated at 5 MMBtu/hr or greater); above are the baseline emissions from boilers as a whole.

### District Rule 4308 Description

Rule 4308 was adopted by the District's Governing Board on October 20, 2005, and limits NOx and CO emissions from boilers, steam generators, and process heaters. This rule applies to any person who supplies, sells, offers for sale, installs, or solicits the installation of any new small boiler, steam generator, process heater or water heater with a rated heat input capacity greater than or equal to 0.075 Million Btu/hr and up to but not including 2.0 Million Btu/hr. Facilities with boilers in this size range may include electrical utilities, crude oil production facilities, manufacturing facilities, and food processing facilities. Exemptions include units installed in manufactured homes and humidifiers, where the products of combustion come into direct contact with the material to be heated.

District Rule 4308 limits NOx emissions at 3% O<sub>2</sub> to the following:

Between 0.075-0.4 MMBtu/hr      0.093 lb NOx/MMBtu

Between 0.4 and 2.0 MMBtu/hr      0.036 lb NOx/MMBtu

Rule 4308 also includes emissions certification protocol, establishes a District certification program, and outlines compliance reports requirements.

On May 30, 2007 EPA took direct final action to approve revisions to the San Joaquin Valley Unified Air Pollution Control District portion of the California State Implementation Plan. These revisions included approval of District Rule 4307. EPA, in evaluating and approving Rule 4308 included the following:

“We believe these rules are consistent with the relevant policy and guidance regarding enforceability, RACT, BACM, and SIP relaxations.” (*CFR Volume 72, Number 103*)

**How does District Rule 4308 compare with federal rules and regulations?****A. EPA – Control Technique Guidelines (CTG)**

District staff's review of the EPA CTG list indicates that there is no CTG for boilers, steam generators, and process heaters – 0.075 MMBtu/hr to 2.0 MMBtu/hr.

**B. EPA – Alternative Control Techniques (ACT) Document**

*NOx Emissions from Industrial/Commercial/Institutional Boilers - EPA-453/R-94-022*

The ACT discusses the different control techniques for controlling NOx emissions from boilers with heat input capacities from 0.4 to 1,500 MMBtu/hr. The ACT also presented the achievable emission levels of several control techniques based on the type of boiler and the type of fuel used. The ACT contains cost effectiveness estimates for different control techniques. However, the ACT does not prescribe the specific emission limits that should be used in developing a regulation to control NOx emissions from boilers.

**C. Standards of Performance for New Stationary Sources (NSPS)**

District staff's review of 40 CFR 60 (Standards of Performance for New Sources) indicates that there is no NSPS for boilers, steam generators, and process heaters – 0.075 MMBtu/hr to 2.0 MMBtu/hr.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

*40 CFR 63 Subpart DDDDD (NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters)*

40 CFR 63 Subpart DDDDD establishes emission limits and work practice standards for boilers and process heaters to regulate hazardous air pollutants such as arsenic, cadmium, chromium, hydrogen chloride, hydrogen fluoride, lead, manganese, mercury, and nickel. NESHAP applies to any boiler process or heaters located at a major source. Existing units are units that commenced construction before January 13, 2003; new units are units built on or after January 13, 2003. Emissions from new units are limited to 0.03 lb/MMBtu for PM, and 400 ppm at 3%O<sub>2</sub> for CO. In general, the applicability, emission limits, and monitoring requirements of Rule 4308 are more stringent than those specified for units that are subject to 40 CFR 60 Subpart DDDDD.

**How does District Rule 4308 compare to rules in other air districts?**

District staff compared NOx limits, optional control requirements, and work practice standards in District Rule 4308 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters) amended May 5, 2006
- Bay Area AQMD Regulation 9 Rule 7 (Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters) adopted November 7, 2007
- Bay Area AQMD Regulation 9 Rule 6 (Nitrogen Oxides Emissions from Natural Gas Fired Boilers and Water Heaters) amended July 20, 2008
- Sacramento Metropolitan AQMD Rule 411 (NOx from Boilers, Process Heaters, and Steam Generators) amended August 23, 2007
- Ventura County APCD Rule 74.11.1 (Large Water Heaters and Small Boilers) adopted September 14, 1999

**A. South Coast AQMD Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters)**

SCAQMD Rule 1146.2 applies to natural gas-fired water heaters, boilers, and process heaters. This rule applies to units that have a rated heat input capacity less than or equal to 2,000,000 Btu per hour. Type 1 units have a rated heat input capacity less than or equal to 400,000 Btu/hr. per hour excluding. Type 2 units have a rated heat input capacity greater than 400,000 Btu/hr, but less than 2,000,000 Btu/hr.

Exemptions include:

- Units used in recreational vehicles.
- Any residential unit
- Units with a rated heat input capacity greater than 400,000 Btu per hour, but less than or equal to 2,000,000 Btu per hour that are demonstrated to use less than 9,000 therms during every calendar year.

Key requirements of the Rule 1146.2 include:

- No person shall manufacture for use, or offer for sale for use, in the District any new Type 2 Unit, unless the NOx emissions level is less than or equal to 30 ppm of NOx emissions and no more than 400 ppm of carbon monoxide (at 3% O<sub>2</sub>, dry)
- No person shall manufacture for use, or offer for sale for use, in the District any new Type 1 Unit, unless the NOx emissions level is less than or equal to 40 nanograms of NOx (calculated as NO<sub>2</sub>) per joule of heat output or 55 ppm NOx emissions (at 3% O<sub>2</sub>, dry)
- On or after January 1, 2006, no person shall operate in the District any unit more than 15 years old, based on the original date of manufacture with a rated heat input capacity greater than 1,000,000 Btu per hour but less than or equal to 2,000,000 Btu per hour and manufactured on or after January 1, 1992, which does not meet emission limits of 30 ppm NOx and 400 ppm of carbon monoxide (at 3% O<sub>2</sub>, dry)
- On or after January 1, 2006, no person shall operate in the District any unit more than 15 years old, based on the original date of manufacture as specified in

paragraph (c)(6), with a rated heat input capacity greater than 400,000 Btu per hour but less than or equal to 1,000,000 Btu per hour manufactured prior to January 1, 2000, which does not meet emission limits of 30 ppm NO<sub>x</sub> and 400 ppm of carbon monoxide (at 3% O<sub>2</sub>, dry)

- On or after January 1, 2010, no person shall manufacture for use or offer for sale for use within the District any Type 2 unit unless the unit is certified pursuant to subdivision (d) to a NO<sub>x</sub> emission level of less than 14 nanograms of NO<sub>x</sub> (calculated as NO<sub>2</sub>) per joule of heat output or less than or equal to 20 ppm of NO<sub>x</sub> emissions (at 3% O<sub>2</sub>, dry).
- On or after January 1, 2012, no person shall manufacture for use or offer for sale for use within the District any Type 1 unit (excluding pool heaters), unless the unit is certified to a NO<sub>x</sub> emission level of less than 14 nanograms of NO<sub>x</sub> (calculated as NO<sub>2</sub>) per joule of heat output or less than or equal to 20 ppm of NO<sub>x</sub> emissions (at 3% O<sub>2</sub>, dry).
- On or after May 5, 2006, the owner or operator of any Type 2 unit shall perform maintenance in accordance with the manufacturer's schedule and specifications as identified in a manual and other written materials supplied by the manufacturer or distributor. The owner or operator shall maintain on site a copy of the manufacturer's and/or distributor's written instructions and retain a record of the maintenance activity for a period of not less than three years.
- The owner or operator shall maintain on site a copy of all documents identifying the unit's rated heat input capacity. The rated heat input capacity shall be identified by a manufacturer's or distributor's manual or invoice.

SCAQMD Rule 11.46.2 and District Rule 4308 apply to similar source categories, and have identical emission limits

Differences between the rules include

- District Rule 4308 applies to all gaseous and liquid fuels while SCAQMD Rule 1146.2 applies only to units fueled by natural gas
- District Rule 4308 does not have exemptions for low-use units
- Rule 1146.2 has an emission limit for older in-use units, Rule 4308 does not

Based on the above discussion, District staff deems that the rules are comparable. The minor differences that the rules have do not make either rule significantly more stringent than the other.

**B. Bay Area AAQMD Regulation 9 Rule 7 (Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)**

BAAQMD Regulation 9 Rule 7 applies to industrial, institutional, and commercial boilers, steam generators, and process heaters. Exemptions include:

- Boilers, steam generators, and process heaters with a rated heat input of 2 MMBtu/hour or less, if fired exclusively with natural gas, liquefied petroleum gas, or any combination thereof

- Boilers, steam generators and process heaters with a rated heat input less than 1 million Btu/hour fired with any fuel
- Boilers, steam generators, and process heaters that are used in petroleum refineries
- Boilers used by public electric utilities or qualifying small power production facilities, as defined in Section 228.5 of the Public Utilities Code, to generate electricity;

Establishes emission limits of 40 ppm for NO<sub>x</sub> and 400 ppm for CO when boilers 1MMBtu/hour or greater are fired with non-gaseous fuel

BAAQMD Regulation 9 Rule 7 only applies to small boilers that are not fired by gaseous fuels. For this subset of the overall source category, District Rule 4308 has more stringent NO<sub>x</sub> emission limits and is more stringent overall.

### **C. Bay Area AQMD Regulation 9 Rule 6 (Nitrogen Oxides Emissions from Natural Gas Fired Boilers and Water Heaters)**

BAAQMD Regulation 9 Rule 6 applies to natural gas fired water heaters and boilers with a heat input capacity less than or equal to 2,000,000 Btu/hr. Exemptions include:

- Units used in recreational vehicles
- Units using a fuel other than natural gas
- Pool/spa heaters with less than 400,000 Btu/hr rated heat input capacity

Emissions limits:

- No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 Btu/Hour, inclusive, manufactured after January 1, 2008, that emits more than 20 nanograms of nitrogen oxides (calculated as NO<sub>2</sub>) per joule of heat output, or more than 30 ppm NO<sub>x</sub> at 3% O<sub>2</sub>, dry.
- No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 Btu/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO<sub>2</sub>) per joule of heat output, or more than 20 ppm NO<sub>x</sub> at 3% O<sub>2</sub>, dry.
- Natural Gas-Fired Pool/Spa Heaters: No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 Btu/Hour, inclusive, manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO<sub>2</sub>) per joule of heat output, or more than 55 ppm NO<sub>x</sub> at 3% O<sub>2</sub>, dry.
- No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 Btu/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO<sub>2</sub>) per joule of heat output, or more than 20 ppm NO<sub>x</sub> at 3% O<sub>2</sub>, dry.

BAAQMD Regulation 9 Rule 6 also has comparable administrative requirements to District Rule 4308.

District Rule 4308 is currently more stringent than BAAQMD Regulation 9 Rule 6. The District rule has comparable emission limits for water heaters and boilers, but has more stringent limits for pool/spa heaters. However, BAAQMD Regulation 9 Rule contains requirements that lower emission limits starting in 2013. It should be noted that the District has a commitment to adopt an amended Rule 4308 in the 4<sup>th</sup> Quarter 2009 which will have emission limits similar to or more stringent than BAAQMD Regulation 9 limits.

#### **D. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 411 (NO<sub>x</sub> from Boilers, Process Heaters, and Steam Generators)**

SMAQMD Rule 411 applies to units (i.e., boilers, steam generators and process heaters) fired on gaseous or nongaseous fuels with a rated heat input capacity equal to or greater than 1 MMBtu/hr.

Exemptions include:

- Any unit that is exclusively used by an electric utility to generate electricity
- Process heaters, kilns, and furnaces where the products of combustion come into direct contact with the material to be heated
- Waste heat recovery boilers

Units 1.0-2.5 MMBtu/hr that use less than 40,000 therms per year are subject to a limited exemption from emission limits.

Applicable Emission Limits:

<b>Boiler Type</b>	<b>NO<sub>x</sub> limit</b>	<b>CO limit</b>
Gaseous Fuel Fired 1-5MMBtu/hr	30 ppm	400 ppm
Non-Gaseous Fuel Fired 1-5MMBtu/hr	40 ppm	400 ppm
Biomass Fuel Firing	70 ppm	400 ppm
Emergency Standby Non-Gaseous Fuel Firing	150 ppm	N/A

SMAQMD Rule 411 has additional monitoring and administrative requirements, although this are primarily directed at larger units that would not be subject to District Rule 4308.

District Rule 4308 is has more stringent NO<sub>x</sub> emission limits for non-gaseous fired units and units fired by biomass. Rule 4308 also does not have allowances for emergency standby non-gaseous fuel firing. SMAQMD Rule 411 has CO emission limits that are absent in Rule 4308.

Overall Rule 4308 is more stringent because it applies to a broader range of units. SMAQMD Rule 411 only applies to units with a rated heat input capacity equal to or greater than 1 MMBtu/hr. SMAQMD also has Rule 413 while applies to residential



water heaters, but there is not a rule that establishes emission limits for boilers, steam generators and process heaters with a rated heat input capacity greater than 75,000 btu/hr and less than 1,000,000 btu/hr.

**E. Ventura County Air Pollution Control District (VCAPCD) Rule 74.11.1 (Large Water Heaters and Small Boilers)**

VCAPCD Rule 74.11.1 applies to any person selling, offering for sale, or installing a new water heater, boiler, steam generator or process heater with a rated heat input capacity greater than 75,000 BTU/hr and less than or equal to 2,000,000 Btu/hr in Ventura County.

VCAPCD Rule 74.11.1 includes specific requirements for small new water heaters, boilers, steam generators or process heaters, including:

- Beginning in 2001, NOx emissions from units with a rated heat input capacity of greater than 75,000 Btu/hr and less than 400,000 Btu/hr shall not exceed 55 parts per million.
- Beginning in 2000, NOx emissions from units with a rated heat input capacity of greater than 400,000 Btu/hr and less than 2,000,000 Btu/hr shall not exceed 30 parts per million. CO emissions shall not exceed 400 parts per million.
- Every subject unit offered for sale in Ventura County shall be certified by the Air Pollution Control Officer.
- The manufacturer shall submit a compliance report for each applicable new or modified unit by model, including a report on a unit source test.

District staff deems that the rules are comparable. They have identical emissions limits, and similar certification and compliance requirements.

**Conclusion**

District Rule 4308 meets all federal requirements and at least as stringent as comparable rules in California. Therefore District Staff conclude that Rule 4308 satisfies RACT for Boilers, Steam Generators, and Process Heaters 0.75 to 2.0 MMBtu/hr.

## Rule 4309 – Dryers, Dehydrators, and Ovens

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NO <sub>x</sub>	2.512	2.631	2.794	2.836	2.965	3.082	3.244	3.390
NO <sub>x</sub> adj	2.51	2.63	1.85	1.88	1.97	2.05	2.14	2.25
VOC	0.389	0.417	0.440	0.446	0.469	0.486	0.512	0.539

(Source: District 2007 Ozone Plan)

### District Rule 4309 Description

Rule 4309, recently adopted on December 15, 2005, limits NO<sub>x</sub> and CO emissions from dryers, dehydrators and ovens. The main rule requirement is the limitation of NO<sub>x</sub> and CO emissions from dryers, dehydrators, and ovens. These limitation and listed below.

Asphalt/Concrete Plant (ppm @ 19% O<sub>2</sub>):

Gaseous fuel: NO<sub>x</sub>: 4.3 ppm; CO: 42 ppm

Liquid fuel: NO<sub>x</sub>: 12.0 ppm; CO: 64 ppm

Milk, Cheese, and Dairy Processing < 20 MMBtu/hr (ppm @ 19% O<sub>2</sub>):

Gaseous fuel: NO<sub>x</sub>: 3.5 ppm; CO: 42 ppm

Liquid fuel: NO<sub>x</sub>: 3.5 ppm; CO: 42 ppm

Milk, Cheese, and Dairy Processing ≥ 20 MMBtu/hr (ppm @ 19% O<sub>2</sub>):

Gaseous fuel: NO<sub>x</sub>: 5.3 ppm; CO: 42 ppm

Liquid fuel: NO<sub>x</sub>: 5.3 ppm; CO: 42 ppm

Other Processes Not Described (ppm @ 19% O<sub>2</sub>):

Gaseous fuel: NO<sub>x</sub>: 4.3 ppm; CO: 42 ppm

Liquid fuel: NO<sub>x</sub>: 4.3 ppm; CO: 42 ppm

On May 30, 2007 EPA took direct final action to approve revisions to the San Joaquin Valley Unified Air Pollution Control District portion of the California State Implementation Plan. These revisions included approval of District Rule 4309. EPA, in evaluating and approving Rule 4309 included the following:

“We believe these rules are consistent with the relevant policy and guidance regarding enforceability, RACT, BACM, and SIP relaxations.” (*CFR Volume 72, Number 103*)

Since Rule 4309 was recently approved by EPA as meeting RACT requirements, the District did not pursue a detailed RACT analysis.

**How does District Rule 4309 compare with federal rules and regulations?**

The District did not conduct a detailed analysis of federal rules and regulations for Rule 4309.

**How does District Rule 4309 compare to rules in other air districts?**

The District did not conduct a detailed comparison to rules in other air districts for Rule 4309.

**Conclusion**

District staff concludes that District Rule 4309 satisfies RACT for dryers, dehydrators, and ovens.

## Rule 4311 – Flares

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0.070	0.082	0.083	0.083	0.084	0.091	0.093	0.090
VOC	0.045	0.049	0.050	0.050	0.051	0.053	0.054	0.055

(Source: District 2007 Ozone Plan)

### District Rule 4311 Description

District Rule 4311, recently amended on June 15, 2006, controls emissions from any operation involving the use of flares. This source category currently includes flares associated with oil and gas production, combustion, sewage treatment, incinerators, petroleum refining, and VOC control. Flaring is a high temperature oxidation process used to burn combustible components, mostly hydrocarbons, of waste gases from industrial operations. 95 percent of the waste gases flared are natural gas, propane, ethylene, propylene, butadiene and butane.

Rule 4311 requires ground level enclosed flares to meet the following emissions limits:

Type of Flare and Heat Release Rate in MMBtu/hr	VOC (lb/MMBtu)	NOx (lb/MMBtu)
<b>Without Steam-assist</b>		
<10 MMBtu	0.0051	0.0952
10-100 MMBtu	0.0027	0.1330
>100 MMBtu	0.0013	0.5240
<b>With Steam-assist</b>		
All	0.14 as TOG	0.068

### How does District Rule 4311 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no EPA CTG for flares.

#### **B. EPA - Alternative Control Technology (ACT)**

There is no EPA ACT for flares.

**C. Standards of Performance for New Stationary Sources (NSPS)**

*40 CFR 60.18 (General Control Device Requirements) and 40 CFR 65.147 (Flares)*

40 CFR 60.18 specifies certain minimum equipment performance standards for equipment used as control devices. In the case of flares, the CFR specifies no visible emission as well as certain equipment standards. Since NO<sub>x</sub> and VOC are invisible gasses, this portion of the CFR does not identify RACT for flares. 40 CFR 65.147 is part of the federal consolidated air rule. It essentially echoes 40 CFR 60.18 and as such does not identify RACT for flares.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for flares.

**How does District Rule 4311 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4311 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1118 (Emissions from Refinery Flares) amended February 1998
- Bay Area AQMD Regulation 12 Rule 11 (Flare Monitoring at Petroleum Refineries) adopted June 4, 2003
- Bay Area AQMD Regulation 12 Rule 12 (Flares at Petroleum Refineries) adopted July 20, 2005
- Sacramento Metro AQMD has no specific prohibitory rule for flares
- Ventura County APCD has no specific prohibitory rule for flares.

**A. SCAQMD Rule 1118 (Emissions from Refinery Flares)**

The emissions data collected as a result of Rule 1118, between 1999 and 2003, was analyzed and resulted in recommendations being made for further strengthening emissions monitoring and reporting procedures, leading to the adoption of amendments on November 4, 2005. The 2005 amendments prohibit the flaring of vent gases except in emergency situations, or during specific operational needs such as startups, shutdowns, and turnarounds. Operational requirements were established and practices to minimize flaring events, set specific annual SO<sub>2</sub> performance targets, require flares to operate in a smokeless manner, and require annual inspections of pressure relief devices directly connected to flares. The rule also contains provisions for refineries to give 24-hour advance notice for each large planned flaring activity, as well as to notify SCAQMD within 1-hour of unexpected flaring events. Also required is the submittal of quarterly reports detailing flow, emissions, and cause of each flaring event. SCAQMD

also requires refineries to set up a 24-hour public telephone number for inquiries on flaring events.

## **B. BAAQMD Regulation 12 Rule 11 and Regulation 12 Rule 12**

BAAQMD Rule 12-11 requires that operators monitor and record emissions data for flares at petroleum refineries. This rule enabled BAAQMD to collect emissions data from refineries. With emissions data BAAQMD was able to determine causes of specific flaring events, as well as estimate the quantity of emissions released during those events. As a result of findings obtained under Rule 12-11, Rule 12-12 was adopted. Rule 12-12 reduces emissions from flares by minimizing the frequency and magnitude of flaring. Rule 12-12 also prohibits the use of refinery flares without the refinery first creating, following, and annually updating an FMP for each flare. Facilities are required to submit flaring reports when a flare, at that facility, releases more than 500,000 standard cubic feet of gas per calendar day (scf/day). The flaring report must identify the cause and to avoid flaring from that cause in the future, if possible. The rule also requires continuous monitoring of the flare system's knock-out drum water seal for leaks, and the submittal of annual reports to BAAQMD that evaluate flaring events that released less than 500,000 scf/day, but SO<sub>2</sub> emitted was more than 500 lbs.

## **Conclusion**

District staff concludes that District Rule 4311 satisfies RACT for flaring operations in terms of emission limits and equipment standards. However, EPA recommends the District reconsider the utility of incorporating provisions such as those in South Coast Air Quality Management District Rule 1118 and Bay Area Air Quality Management District Rule 12-12 within Rule 4311 to air their enforcing of the rule, developing an accurate emissions inventory for these sources, and minimizing excess emissions from flare activity to the maximum extent practicable." The experience of the Bay Area AQMD and South Coast AQMD in incorporating flare minimization plans (FMPs) have resulted in data being gathered, which can be used to evaluate the effectiveness of FMPs in reducing flaring events. To this end, District staff is in the process of amending this rule to incorporate the use of FMPs. As outlined Table 4-3, it is expected that the rule will go before the District's Governing Board for approval during the second quarter of 2009.

## Rule 4313 – Lime Kiln

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NO <sub>x</sub>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(Source: District 2007 Ozone Plan)

### District Rule 4313 Description

This rule applies to lime kilns. The purpose of this rule is to limit NO<sub>x</sub> emissions from the operation of lime kilns.

### How does District Rule 4313 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

##### *40 CFR Part 60 Subpart HH – Standards for Performance for Lime Manufacturing Plants*

The provisions of this subpart are applicable to each rotary lime kiln used in the manufacturing of lime. However, this subpart only has requirements for the particulate matter emissions from the rotary lime kilns. District Rule 4313 only has requirements for NO<sub>x</sub> and VOC emissions from lime kilns. Since 40 CFR Part 60 Subpart HH and District Rule 4313 do not have requirements for the same pollutants, they cannot be compared to determine if District Rule 4313 satisfies RACT. In addition, the RACT analysis is only evaluating VOC and NO<sub>x</sub> emissions. Since this subpart only has provisions for PM emissions, it will not have any impact in the District's RACT analysis conclusion.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)***Subpart AAAAA—National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing Plants*

The provisions of this NESHAP are applicable to each rotary lime kiln used in the manufacturing of lime. However, this NESHAP only has requirements for the particulate matter emissions from the rotary lime kilns. District Rule 4313 only has requirements for NO<sub>x</sub> and VOC emissions from lime kilns. Since 40 CFR Part 63 Subpart AAAAA and District Rule 4313 do not have requirements for the same pollutants, they cannot be compared to determine if District Rule 4313 satisfies RACT. In addition, the RACT analysis is only evaluating VOC and NO<sub>x</sub> emissions. Since this subpart only has provisions for PM emissions, it will not have any impact in the Districts RACT analysis conclusion.

**How does District Rule 4313 compare to rules in other air districts?**

District staff looked at the rules and regulations for air districts located in other California nonattainment areas. None of the following air districts have a rule that is applicable to lime kilns: South Coast AQMD, Bay Area AQMD, Sacramento Metro AQMD, Ventura County APCD

**Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4313 satisfies RACT for lime kilns.



## Rule 4352 – Solid Fuel Boilers, Steam Generators and Process Heaters

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	4.0	4.0	4.1	4.1	4.1	4.1	4.2	4.2
VOC	0.406	0.408	0.409	0.409	0.409	0.411	0.413	0.413

(Source: District 2007 Ozone Plan)

### District Rule 4352 Description

Rule 4352 applies to solid fuel fired boilers, steam generators, and process heaters. Units subject to Rule 4352 are not subject to Rules 4351, 4305, 4306, 4307, and 4308 because these rules apply to boilers, steam generators, and process heaters fired on gaseous or liquid fuel.

District Rule 4352 requires municipal solid waste units to meet a NOx limit of 200 ppmv @ 12% CO<sub>2</sub>. For all other units the NOx limit is 115 ppmv @ 3% O<sub>2</sub>.

### How does District Rule 4352 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no EPA CTG for boilers, steam generators, and process heaters.

#### **B EPA – Alternative Control Technology (ACT)**

*EPA –453/R-94-022 “Alternative Control Techniques (ACT) Document – NOx Emissions from Industrial/Commercial/Institutional Boilers”, dated March 1994*

The ACT discusses the different control techniques for controlling NOx emissions from boilers with heat input capacities from 0.4 to 1,500 MMBtu/hr. The ACT also presented the achievable emission levels of several control techniques based on the type of boiler and the type of fuel used. The ACT contains cost effectiveness estimates for different control techniques. However, the ACT does not prescribe the specific emission limits that should be used in developing a regulation to control NOx emissions from boilers.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

1. *40 CFR 60 Subpart D (Standards of Performance for Fossil-Fuel Fired Steam Generators for Which Construction Commenced After August 17, 1971)*

40 CFR 60 Subpart D applies to fossil fuel-fired, and fossil fuel and wood residue-fired steam generating units of more than 250 MMBtu/hr that commenced construction or

modification after August 17, 1971. Subpart D establishes the emission standards for NO<sub>x</sub>, SO<sub>x</sub>, and PM. Since Rule 4352 applies to units that are fired on solid fuel, this analysis focuses only on the NO<sub>x</sub> standards established in 40 CFR 60 Subpart D for similar type of fuel.

NO<sub>x</sub> limits:

- Wood residue, or gaseous fossil fuel and wood residue – 0.30 lb/MMBtu
- Solid fossil fuel or solid fossil fuel and wood residue (except lignite or a solid fossil fuel containing 25 percent, by weight, or more of coal refuse) – 0.70 lb/MMBtu
- Lignite or lignite and wood residue – 0.60 lb/MMBtu
- Lignite which is mined in North Dakota, South Dakota, or Montana and which is burned in a cyclone-fired unit – 0.80 lb/MMBtu

In general, the applicability, emission limits, and monitoring requirements of Rule 4352 are more stringent than those specified for units that are subject to 40 CFR 60 Subpart D. The relevant standards used for comparing the draft rule with 40 CFR 60 Subpart D are shown in the Rule Consistency Table.

2. *40 CFR 60 Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units)*

40 CFR 60 Subpart Db applies to steam generating units with a heat input capacity of greater than 100 MMBtu/hr that commence construction, modification, or reconstruction after June 19, 1984. Steam generating units, as defined in 40 CFR 60 Subpart Db, do not include process heaters. Rule 4352 applies to solid fuel fired units so this analysis focuses only on the NO<sub>x</sub> standards established in 40 CFR 60 Subpart Db for similar type of fuel.

NO<sub>x</sub> limits:

- Mass-feed stoker – 0.50 lb/MMBtu.
- Spreader stoker and fluidized bed combustion – 0.60 lb/MMBtu.
- Pulverized coal – 0.70 lb/MMBtu
- Lignite – 0.60 lb/MMBtu
- Lignite mined in ND, SD, MT, and combusted in a slag tap furnace – 0.80 lb/MMBtu.
- Coal-derived synthetic fuels – 0.50 lb/MMBtu

In general, the applicability, emission limits, and monitoring requirements of Rule 4352 are more stringent than those specified for units that are subject to 40 CFR 60 Subpart Db.

3. *40 CFR 60 Subpart Cb (Emissions Guidelines and Compliance Times for Large Municipal Waste Combustors That are Constructed on or Before September 20, 1994)*

40 CFR 60 Subpart Cb applies to each municipal waste combustor unit with a combustion capacity greater than 250 tons per day of municipal solid waste for which construction was commenced on or before September 20, 1994. Rule 4352 applies to solid fuel fired units so this analysis focuses only on the NO<sub>x</sub> standards established in 40 CFR 60 Subpart Cb for similar type of fuel.

NO<sub>x</sub> limits:

- Mass burn waterwall – 205 ppm at 7% O<sub>2</sub>
- Mass burn rotary waterwall – 250 ppm at 7% O<sub>2</sub>
- Refuse-derived fuel combustor – 250 ppm at 7% O<sub>2</sub>
- Fluidized bed combustor – 240 ppm at 7% O<sub>2</sub>
- Mass burn refractory combustors - no limit
- Fluidized bed combustor – 180 ppm at 7% O<sub>2</sub>

4. *40 CFR 63 Subpart DDDDD (NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters)*

40 CFR 63 Subpart DDDDD establishes emission limits and work practice standards for boilers and process heaters to regulate hazardous air pollutants such as arsenic, cadmium, chromium, hydrogen chloride, hydrogen fluoride, lead, manganese, mercury, and nickel. NESHAP applies to any boiler process or heaters located at a major source. Existing units are units that commenced construction before January 13, 2003; new units are units built on or after January 13, 2003.

5. *EPA Policy on Start-up or Shutdown*

Section 5.3 of Rule 4352 establishes certain operational standards that must be met during start-up or shutdown of boilers, steam generators, and process heaters. District staff believes that the proposed start-up or shutdown provisions are consistent with the EPA policy as discussed in an EPA memorandum, dated February 15, 1983, "Policy on Excess Emissions During Start-up, Shutdown, Maintenance and Malfunctions" which prohibits automatic exemption during periods of start-up or shutdown of a unit.

6. *EPA Policy on Recordkeeping*

The recordkeeping requirement in Section 6.2 of Rule 4352 is consistent with EPA's policy to keep and maintain records for at least five years.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this category.

## How does District Rule 4352 compare to rules in other air districts?

District staff compared NOx limits, exemptions, and control requirements in District Rule 4352 to comparable requirements in rules from the following California nonattainment areas:

- South Coast Air Quality Management District
- Bay Area Air Quality Management District
- Sacramento Metro Air Quality Management District
- Ventura County Air Pollution Control District

1. *South Coast Air Quality Management District Rule (SCAQMD) 1146 (Emissions of oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters) last amended September 5, 2008*

SCAQMD Rule 1146 applies to boilers, steam generators, and process heaters of equal to or greater than 5 million Btu per hour rated heat input capacity used in all industrial, institutional, and commercial operations with the exception of:

- boilers used by electric utilities to generate electricity; and
- boilers and process heaters with a rated heat input capacity greater than 40 million Btu per hour that are used in petroleum refineries; and
- sulfur plant reaction boilers.

SCAQMD Rule 1146 establishes a 40ppm NOx emission limit for all units fired on non-gaseous fuel.

### *Comparison of SCAQMD Rule 1146 and District Rule 4352*

SCAQMD Rule 1146 applies to all large boilers, steam generators and process heaters, regardless of fuel type. NOx emission limits in SCAQMD Rule 1146 are more stringent than emission limits for solid fuel fired units in District Rule 4352.

Overall SCAQMD Rule 1146 is more stringent than District Rule 4352 when it is applied to solid fuel fired units. The District believes that that a 40ppm NOx emission limit is technologically infeasible for solid fuel fired units, and is not aware of any solid fuel fired boiler, steam generator or process heater that has operated at this level.

2. *South Coast Air Quality Management District (SCAQMD) Rule 1146.1 (Emissions of oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters) last amended September 5, 2008*

SCAQMD Rule 1146 applies to boilers, steam generators, and process heaters that are greater than 2 million BTU per hour and less than 5 million Btu per hour rated heat input capacity used in any industrial, institutional, or commercial operation.

SCAQMD Rule 1146.1 establishes a 30ppm NO<sub>x</sub> emission limit for all units fired on non-gaseous fuel.

#### *Comparison of SCAQMD Rule 1146.1 and District Rule 4352*

SCAQMD Rule 1146.1 applies to all small boilers, steam generators and process heaters, regardless of fuel type. NO<sub>x</sub> emission limits in SCAQMD Rule 1146.1 are more stringent than emission limits for solid fuel fired units in District Rule 4352.

Overall SCAQMD Rule 1146.1 is more stringent than District Rule 4352 when it is applied to solid fuel fired units. The District believes that that a 30ppm NO<sub>x</sub> emission limit is technologically infeasible for solid fuel fired units, and is not aware of any solid fuel fired boiler, steam generator or process heater that has operated at this level.

#### 3. *Bay Area Air Quality Management District (BAAQMD) Regulation 9 Rule 7 (Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters) adopted November 7, 2007*

BAAQMD Regulation 9 Rule 7 applies to industrial, institutional, and commercial boilers, steam generators, and process heaters. Exemptions include:

- Boilers, steam generators, and process heaters with a rated heat input of 2 MMBtu/hour or less, if fired exclusively with natural gas, liquefied petroleum gas, or any combination thereof
- Boilers, steam generators and process heaters with a rated heat input less than 1 million BTU/hour fired with any fuel
- Boilers, steam generators, and process heaters that are used in petroleum refineries
- Boilers used by public electric utilities or qualifying small power production facilities, as defined in Section 228.5 of the Public Utilities Code, to generate electricity;

BAAQMD Regulation 9 Rule 7 establishes emission limits of 40ppm for NO<sub>x</sub> and 400ppm for CO when boilers 1MMBtu/hour or greater are fired with non-gaseous fuel.

#### *Comparison of BAAQMD Regulation 9 Rule 7 and District Rule 4352*

BAAQMD Regulation 9 Rule 7 applies to all small boilers, steam generators and process heaters, regardless of fuel type. NO<sub>x</sub> emission limits in BAAQMD Regulation 9 Rule 7 are more stringent than emission limits for solid fuel fired units in District Rule 4352.

Overall BAAQMD Regulation 9 Rule 7 is more stringent than District Rule 4352 when it is applied to solid fuel fired units. The District believes that that a 40ppm NO<sub>x</sub> emission limit is technologically infeasible for solid fuel fired units, and is not aware of any solid fuel fired boiler, steam generator or process heater that has operated at this level.

4. *Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 411 (NOx from Boilers, Process Heaters, and Steam Generators) last amended August 23, 2007*

SMAQMD Rule 411 applies to units (i.e., boilers, steam generators and process heaters) fired on gaseous or nongaseous fuels with a rated heat input capacity equal to or greater than 1 MMBtu/hr. Exemptions include:

- Any unit that is exclusively used by an electric utility to generate electricity
- Process heaters, kilns, and furnaces where the products of combustion come into direct contact with the material to be heated
- Waste heat recovery boilers

Units 1.0-2.5 MMBtu/hr that use less than 40,000 therms per year are subject to a limited exemption from emission limits.

Applicable Emission Limits:

<b>Boiler Type</b>	<b>NOx limit</b>	<b>CO limit</b>
Gaseous Fuel Fired 1-5MMBtu/hr	30ppm	400ppm
Non-Gaseous Fuel Fired 1-5MMBtu/hr	40ppm	400ppm
Biomass Fuel Firing	70ppm	400ppm
Emergency Standby Non-Gaseous Fuel Firing	150ppm	N/A

*Comparison of SMAQMD Rule 411 and District Rule 4352*

SMAQMD Rule 411 applies to units fired on gaseous or non-gaseous fired fuels. NOx emission limits for non-gaseous fuel fired units in SMAQMD Rule 411 are more stringent than emission limits for solid fuel fired units in District Rule 4352.

Overall SMAQMD Rule 411 is more stringent than District Rule 4352 when it is applied to solid fuel fired units. The District believes that that a 40ppm NOx emission limit is technologically infeasible for solid fuel fired units, and is not aware of any solid fuel fired boiler, steam generator or process heater that has operated at this level.

5. *Ventura County Air Pollution Control District (VCAPCD) Rule 74.15 (Boilers, Steam Generators, and Process Heaters) last amended November 8, 1994*

VCAPCD Rule 74.15 applies to boilers, steam generators and process heaters used in all industrial, institutional and commercial operations with a rated heat input capacity of equal to or greater than, 5 million BTUs per hour. Exemptions include:

- Utility electric power generating units
- Auxiliary boilers used with a utility electric power generating unit
- Water heaters

VCAPCD Rule 74.15 establishes a 40ppm NOx emission limit for units subject to the rule.

*Comparison of VCAPCD Rule 74.11.1 and District Rule 4352*

VCAPCD Rule 74.15 applies to all large boilers, steam generators and process heaters, regardless of fuel type. NOx emission limits in SMAQMD Rule 411 are more stringent than emission limits for solid fuel fired units in District Rule 4352.

Overall VCAPCD Rule 74.15 is more stringent than District Rule 4352 when it is applied to solid fuel fired units. The District believes that that a 40ppm NOx emission limit is technologically infeasible for solid fuel fired units, and is not aware of any solid fuel fired boiler, steam generator or process heater that has operated at this level.

6. *Ventura County Air Pollution Control District (VCAPCD) Rule 74.15.1 (Boilers, Steam Generators, and Process Heaters) last amended June 13, 2000*

VCAPCD Rule 74.15.1 applies to boilers, steam generators and process heaters with a rated heat input capacity equal to or greater than 1 million BTU per hour and less than 5 million BTU per hour.

VCAPCD Rule 74.15.1 establishes a 30ppm NOx emission limit for units subject to the rule.

*Comparison of VCAPCD Rule 74.15.1 and District Rule 4352*

VCAPCD Rule 74.15.1 applies to all small boilers, steam generators and process heaters, regardless of fuel type. NOx emission limits in SMAQMD Rule 411 are more stringent than emission limits for solid fuel fired units in District Rule 4352.

Overall VCAPCD Rule 74.15.1 is more stringent than District Rule 4352 when it is applied to solid fuel fired units. The District believes that that a 30ppm NOx emission limit is technologically infeasible for solid fuel fired units, and is not aware of any solid fuel fired boiler, steam generator or process heater that has operated at this level.

**Conclusion**

The District maintains that the ARB RACT/BARCT guidelines for non-gaseous fired units were not meant to apply to solid fuel fired boilers based on the description of control technology options. The District applies the 40ppm emission limit to liquid fired units.

Permitted units subject to Rule 4352 are all equipped with non-catalytic selective reduction systems which the District considers to be BARCT for this application.

Further, the District does not believe that a 40ppm NOx emission limit is technologically infeasible for solid fuel fired units, and is not aware of any solid fuel fired boiler, steam generator or process heater that has operated at this level.

After careful evaluation of federal rules or regulations covering emissions from this source category as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4352 satisfies RACT for solid fuel boilers, steam generators, and process heaters.



## Rule 4354 – Glass Melting Furnaces

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	9.38	8.02	8.56	8.73	9.08	9.64	10.12	10.65
VOC	0.337	0.39	0.415	0.423	0.440	0.469	0.49	0.515

(Source: District 2007 Ozone Plan)

### District Rule 4354 Description

This rule controls NO<sub>x</sub>, SO<sub>x</sub>, VOC, and CO emissions from any glass-melting furnace located at facilities that have the total potential to emit of at least ten tons per year of NO<sub>x</sub> or at least ten tons per year of VOC. The emission limits depend on type of glass produced, furnace firing technology and emission averaging period. NO<sub>x</sub> emission limits range from 4.0 to 9.2 pounds NO<sub>x</sub> per ton of glass pulled (lb/ton glass); CO limits are 300 ppmv or 0.9 to 1.0 lbs/ton glass; and VOC emission limits are 20 ppmv or range from 0.1 to 0.25 lbs/ton glass.

Operators of multiple furnaces have the option to average emissions across the furnaces in order to comply with the emission limits. Operators who select this option are required to meet emission limits that are 10% lower than if they had controlled each furnace individually.

Operators meet current emission limits through a selection of furnace firing technology and glass raw materials. There are a range of NO<sub>x</sub> control strategies to achieve the current emission limits. These strategies go beyond low-NO<sub>x</sub> or ultra-low-NO<sub>x</sub> burners and electric boost to advanced controls like oxygen-enriched air staging (OEAS), replacement of combustion air with pure oxygen (oxy-fuel firing), and fuel re-burn technology (the proprietary 3-R process). One source is in the process of converting to selective catalytic reduction (SCR) for NO<sub>x</sub> control. This SCR system will be the first in the US on a glass furnace.

### How does District Rule 4354 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

*EPA-453/R-94-037 Alternative Control Techniques Document – NO<sub>x</sub> Emissions from Glass Manufacturing*

This document outlines the available control techniques for three types of glass melting furnaces – container glass, flat glass and pressed-and-blown glass. The document lists no specific NOx emission limit, although it does suggest estimated percent NOx reduction from uncontrolled levels. In not having a specific NOx limit for any of the subject furnaces, the document does not define RACT for the three types of glass.

There is no ACT for glass melting furnaces at either wool fiberglass or strand fiberglass manufacturing facilities.

### **C. Standards of Performance for New Stationary Sources (NSPS)**

*40 CFR 60 Subpart CC – Standards of Performance for Glass Manufacturing Plants; and 40 CFR Subpart PPP – Standards of Performance for Wool Fiberglass Insulation Plants*

These NSPSs target the control of particulate matter from the specified glass manufacturing processes. As such, neither NSPS defines applicable RACT for these sources. There is no NSPS for fiberglass strand furnaces.

### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is one NESHAP that could apply to glass melting furnaces – 40 CFR 61 Subpart N (National Emission Standard for Inorganic Arsenic Emissions from Glass Manufacturing Plants). An arsenic-containing compound could be used in the glass recipe to improve glass quality, although no glass manufacturer subject to the District rule uses the arsenic compound in their operations. The NESHAP specifically targets inorganic arsenic emissions, and therefore, does not apply to NOx or VOC emission limits. The NESHAP does not define applicable RACT for this source category.

There are two MACT standards that apply to glass melting furnaces – 40 CFR 63 Subpart NNN (National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing Plants) and 40 CFR 63 Subpart SSSSSS (National Emission Standards for Hazardous Air Pollutants for Glass Manufacturing Area Sources). The portions of both MACTs that apply to the glass melting furnaces are particulate emission limits and subsequent recordkeeping. As such, they do not regulate NOx or VOC for this source category; therefore the MACT standard does not define applicable RACT for this source category.

### **How does District Rule 4354 compare to rules in other air districts?**

District staff compared NOx limits, optional control requirements, and work practice standards in District Rule 4354 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1117, as amended January 1984
- Bay Area AQMD Regulation 9 Rule 12, as adopted January 1994
- Ventura County APCD and Sacramento Metro AQMD do not have a specific prohibitory rule for this source category.

**A. South Coast AQMD Rule 1117 (Emissions of Oxides of Nitrogen from Glass Melting Furnaces)**

South Coast AQMD Rule 1117 has a single NO<sub>x</sub> limit of 4.0 pounds per ton glass pulled, however the limit does not apply to tableware glass, flat glass, or fiberglass furnaces – these are specifically exempt under Rule 1117. This means that Rule 1117 applies only to container glass furnaces. Alternative emission control plans are allowed which let emissions to be averaged over more than one furnace as long as the total emissions are no greater than if each furnace was individually meeting the emission limit. Recent amendments to District Rule 4354 have reduced NO<sub>x</sub> limits for container glass which are lower than South Coast Rule 1117. The District rule also goes beyond the South Coast AQMD rule to limit NO<sub>x</sub> emissions from flat glass and fiberglass furnaces. Additionally, the alternative emission control plan in District Rule 4354 requires a 10% reduction in total emissions for the averaged group of furnaces over controlling the furnaces individually.

**B. Bay Area AQMD Regulation 9 Rule 12 (Nitrogen Oxide Emissions from Glass Melting Furnaces)**

Bay Area AQMD Regulation 9 Rule 12 has a single NO<sub>x</sub> emission limit of 5.5 pounds NO<sub>x</sub> per ton glass pulled, which is lower than current District Rule 4354 NO<sub>x</sub> emission limits for flat glass. However, there are no flat glass furnaces within Bay Area AQMD, meaning the emission limit has not been achieved in practice in the Bay Area AQMD for flat glass furnaces. On April 3, 2009, Mr. Weyman Lee of BAAQMD has verified that there are no flat glass furnaces within the BAAQMD. With the most recent amendments to District Rule 4354, the NO<sub>x</sub> emission limit for every category of glass is more stringent than the NO<sub>x</sub> limit in Bay Area AQMD Regulation 9 Rule 12.

**Are additional cost-effective controls available?**

As noted above, the current furnaces are already utilizing advanced control technologies for NO<sub>x</sub>. Table 2 below details the NO<sub>x</sub> control technologies being used within the District. All 14 glass melting furnaces in the District are using low-NO<sub>x</sub> or ultralow NO<sub>x</sub> burners in conjunction with the advanced NO<sub>x</sub> controls. The estimated emission reductions are taken from EPA's ACT for glass furnaces. Cost effectiveness was taken from the recent rule amendment project where only SCR and oxy-fuel firing were considered sufficient to meet the new NO<sub>x</sub> limits. While SCR is new to US glass furnaces, it has been in use in Europe for several years.

Table 2 – NOx Control Strategies, Cost Effectiveness, and Actual Technology Utilization

NOx Control Technology	Estimated Emission Reduction over Uncontrolled Furnaces	Estimated Cost Effectiveness (\$/ton reduced)	Number District Furnaces Currently Using This Technology
Low-NOx or Ultra-low NOx burners	30% to 40%	---	14
Electric Boost	10% to 30%	---	Unable to tell from individual permits
Oxygen Enriched Air Staging (OEAS)	30% to 75%	---	3
Oxygen Fuel (oxy-fuel) Firing	75% to 85%	\$51,700	6
Fuel Re-burn (3-R)	50% to 65%	---	1
Selective Catalytic Reduction (SCR)	75% to 90%	\$2,180 – \$10,800	1

### **Were relevant public comments received recently about Rule 4354?**

Relevant public comments received during the public process for adopting the District's 2008 Ozone Plan have been addressed in Appendix L of the plan.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4354 satisfies RACT for glass melting furnaces.

## Rule 4401 – Steam Enhanced Crude Oil Production Well Vents

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	13.5	13.2	12.6	12.5	11.7	11.3	11.0	12.1

(Source: District 2007 Ozone Plan)

### District Rule 4401 Description

This rule controls VOC emissions from steam-enhanced crude oil production well vents. The primary source of VOC emissions from the wells is the casing vent. The emissions from a casing vent are usually controlled through the operation of a VOC collection and control device.

This rule prohibits the operation of a steam-enhanced crude oil production well, except cyclic wells meeting certain requirements, unless the uncontrolled VOC emissions from any well vent are reduced by at least 99 percent by weight, or, if several steam-enhanced crude oil production well vents are connected to a vapor collection and control system, this rule requires that total uncontrolled VOC emissions be reduced by at least 99 percent.

Fugitive VOC emissions can also occur from oil and gas flowing through the various components (such as valves and flanges) that are part of the piping from the wells to the emission control system. Rule 4401 contains a schedule that specifies the number of allowable component leaks based on the number of wells connected to a vapor collection and control system. Rule 4401 requires an operator, upon detection of a leak, to affix a readily visible tag bearing the date on which the leak is detected. Rule 4401 further requires an operator to repair a leak within fifteen (15) calendar days; failure to repair the leak would constitute a violation of the rule.

### How does District Rule 4401 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

**C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this source category.

**How does District Rule 4401 compare to rules in other air districts?**

District staff compared control requirements, and work practice standards in District Rule 4401 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1148, as amended November 5, 1982
- Bay Area AQMD, Sacramento Metropolitan AQMD, and Ventura County APCD do not have a prohibitory rule that covers the same emission source category

**South Coast AQMD Rule 1148**

South Coast AQMD Rule 1148 (Thermally Enhanced Oil Recovery Wells) requires that ROG emissions from a steam drive well not to exceed 4.5 lb/day or if steamed drive wells are connected to vapor control system ROG emissions from the control system shall average no more than 4.5 lb/day/connected well.

Using CARB emissions factor for uncontrolled steam drive well of 220 lb-VOC/day, Rule 4401's 99% control requirement equates to 2.2 lb/day/well, which is more stringent than 4.5 lb/day/well (heavy oil production results in no methane or ethane, meaning 100% of ROGs are considered VOCs).

South Coast AQMD Rule 1148 does not specify any fugitive VOC leak detection and repair provisions where as Rule 4401 specifies the number of allowable component leaks based on the number of wells connected to a vapor collection and control system. Rule 4401 requires an operator, upon detection of a leak, to affix a readily visible tag bearing the date on which the leak is detected. Rule 4401 further requires an operator to repair a leak within fifteen (15) calendar days; failure to repair the leak would constitute a violation of the rule.

South Coast AQMD Rule 1148 contains a six month exemption for steam drive wells if steam is injected more frequently than 45 days and amount of steam injection expressed as water is more than 2,000 barrels. Rule 4401 provides exemptions for up to 40 cyclic wells owned by a company that are undergoing pilot testing and well stimulation. Rule 4401 also exempts for up to 5 cyclic wells (20 cyclic wells for small producer) if wells are located more than 1000 feet from an existing well control system

operated by the company and operation is under District permit. South Coast AQMD Rule 1148 does not limit number of wells that can be exempt and Rule 4401 does not limit duration of exemption, therefore exemptions in the both rules can not be compared directly.

Both South Coast AQMD Rule 1148 and Rule 4401 require annual testing of vapor control systems. However District Rule waives this testing requirement if uncondensed vapors are incinerated in fuel burning equipment, internal combustion engine or in a smokeless flare.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4401 satisfies RACT for steam-enhanced crude oil production well vents.

## Rule 4402 – Crude Oil Production Sumps

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.42	0.41	0.40	0.39	0.37	0.36	0.35	0.39

(Source: District 2007 Ozone Plan)

On April 1, 2009, the United State Environmental Protection Agency (EPA) Region IX sent a comment recommending the RACT analysis clarify how the 3 to 60 tons/day emissions inventory cited in the District's 2007 Ozone Plan was in error. The District consultant's emissions inventory methodology which estimated 60 tons/day VOC from sumps was based on Department of Oil, Gas, and Geothermal Energy (DOGGR) database of sumps compiled in early 1990s including surface area of sumps and characteristic of fluids, data on sump closures from Central Valley Regional Water Quality Control Board (RWQCB) and District survey in 1997. It is important to note that DOGGR and RWQCB data on number of sumps and surface areas are not as accurate as the recent data submitted by oil producers in the San Joaquin valley (Valley) to the District during the emissions inventory survey in late 2007. The 60 tons/day VOC estimated by the consultant in November 2003 was based on an estimated total 660 sumps with a total surface area of 9,590,945 square feet<sup>1</sup>. In contrast, the 2007 District sump emissions inventory<sup>2</sup> of oil producers in the Valley showed that there are only a total of 95 sumps with a total surface area of 308,763 square feet. Furthermore, the consultant used the California Air Resources Board's default emission factors for sumps while the recent District inventory used the emission factors developed by the District based on data from source testing of sumps in Kern County. The updated emission factors were published in the District's corrected "Technical Guidance for Emissions Inventory Criteria and Guidelines Regulation for AB 2588 (Air Toxics "Hot Spots" Information and Assessment Act of 1987). The 2007 District emissions inventory estimated VOC emission from sumps is about 2.6 tons/day. The District expects to finalize the area source emissions inventory methodology report by end of April 2009 and thereafter submit an updated sumps inventory to the California Air Resources Board.

### District Rule 4402 Description

District Rule 4402 controls VOC emissions from crude oil production sumps located at facilities that produce heavy crude oil. Rule 4402 requires sumps to have a flexible floating cover, rigid floating cover, or fixed roof cover. The flexible floating cover has to be equipped between the sump wall and the cover edge, and the gap between the wall

<sup>1</sup> "Emission Inventory Methodology- Oil and Gas Sumps (Methods Document STI-903340-242f-MD)", Sonoma Technology, Inc., November 7, 2003.

<sup>2</sup> Draft 2007 Area Source Emissions Inventory Methodology, 310 – Oil Production Sumps and Well Cellars posted in [www.valleyair.org/busind/draft-policies/sumpscellars](http://www.valleyair.org/busind/draft-policies/sumpscellars) 2007.pdf.



and at every point around the perimeter must not exceed 1 inch. The fixed-roof cover must have a PV and meet certain specific requirements. If sumps are replaced with above-ground fixed roof tanks, the tanks must comply with the provisions of Rule 4623.

**How does District Rule 4402 compare with federal rules and regulations?**

**A. EPA – Control Technique Guidelines (CTG)**

District staff's review of the EPA CTG list indicates that there is no CTG for crude oil production sumps.

**B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for crude oil production sumps.

**C. Standards of Performance for New Stationary Sources (NSPS)**

District staff's review of 40 CFR 60 (Standards of Performance for New Sources) indicates that there is no NSPS for crude oil production sumps.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

District staff's review of 40 CFR 61 (NESHAP) and 40 CFR (NESHAP for Source Categories) indicates that there is no NESHAP or MACT for crude oil production sumps.

**How does District Rule 4402 compare to rules in other air districts?**

District staff compared District Rule 4402 with the rules of other California ozone nonattainment air districts' rules (South Coast Air Quality Management District, Bay Area Air Quality Management District, Sacramento Metropolitan Air Quality Management Air District, and Ventura County Air Pollution Control District on crude oil production sumps. The results of the analysis are discussed below.

The control requirements of Rule 4402 are essentially the same as Ventura County Air Pollution Control District (VCAPCD) Rule 71.4. South Coast AQMD, Bay Area AQMD, Sacramento AQMD do not have any rule on crude oil production sumps.

Although VCAPCD Rule 71.4 prohibits the use of first stage sumps, District staff believes that other VCAPCD either do not have first stage sumps or such sumps have been replaced with tanks. Although use of first stage sumps is allowed by District Rule 4402, it does not necessarily mean that the rule is less stringent than other air districts' rules, for the following reason. If first stage sumps are replaced with tanks, the tanks

would be subject to another rule that control emissions from the storage of organic liquids. District Rule 4623 (Storage of Organic Liquids) applies to tanks that have a capacity of at least 1,100 gallons that store organic liquids with a true vapor pressure (TVP) of 0.5 psia or greater. The tank VOC control requirements are based on the tank size and true vapor pressure (TVP) of the stored organic liquid. Organic liquids with a TVP less than 0.5 psia would not be subject to the VOC control requirements of Rule 4623. Replacing first stage sump with a tank could result in an unintended consequence that the tank would either be totally uncontrolled or less effectively controlled compared to Rule 4402 because the TVP might be lower than the control trigger level specified in Rule 4623.

Based on the District's Permit database, staff has determined that there are only very few permitted small-size first-stage sumps for processing heavy crude oil that were issued to very small producers (less than 150 barrels of oil/day production) and they are not major sources (less than 10 tons per year of VOC or NOx)<sup>3</sup>. The source testing required by Rule 4623, shows the TVP of the heavy crude oil is less than 0.5 psia. As discussed above, prohibiting the use of first stage sumps would essentially force operators to replace the sumps with tanks, which could result in the tanks being exempt from Rule 4623 because the TVP is less than 0.5 psia. Although Rule 4402 allows the use of first stage sumps, the controls are equal to or better than that which would be required for such materials stored in tanks. Furthermore, it is important to mention that the District's 2007 survey of crude oil sumps<sup>4</sup> revealed that there are no active first stage sumps operating in the San Joaquin Valley. Therefore, staff believes that existing control requirements of the rule satisfy RACT for this operation.

District staff reviewed other air districts' rules for this source category and found that, except for SBCAPCD Rule 344, other air districts rules that control VOC emissions from sumps have no exemption for small producer sumps; no minimal emissions exemption; and have a lower limit (based on a lower VOC content) for the clean produced water exemption. SBCAPCD Rule 344 exempts sumps of oil producer producing 150 barrels of oil/day regardless of the type of oil (light or heavy crude oil).

Rule 4402 exempts small producers' second and third stage sumps less than 1,000 square feet surface area used exclusively for heavy crude oil. Another exemption is provided for very small producer second and third stage sumps less than 5,000 square feet used exclusively for heavy crude oil. Small producer is defined in the rule as a producer whose oil production does not exceed 6,000 barrels/day. Very small oil producer is defined in Rule 4402 as a producer whose oil production does not exceed 150 barrels/day, similar to SBCAPCD Rule 344.

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<sup>3</sup> Smilodon Oil Company (Facility ID S-2771); Woodward Oil Company (Facility ID S-780); Arthur McAdams (Facility ID S-2288); Gotland Oil (Facility ID S-2803 and S-2804). The total controlled VOC emissions from these five heavy oil first stage sumps are estimated at 0.04 tons per day. Recent District's survey indicated no first stage sumps operating in the District.

<sup>4</sup> Draft 2007 Area Source Emissions Inventory Methodology, 310 – Oil Production Sumps and Well Cellars posted in <http://www.valleyair.org/busind/draft-policies/sumpscellars2007.pdf>.

Rule 4402 exemption for small/very small producers' second stage and third stage sumps are exclusively for heavy crude oil and only for small size sumps. As discussed above, the TVP of heavy crude oil is less than 0.5 psia. Low-TVP heavy crude oil emits less VOC than higher TVP light crude oil. The VOC emissions from small size second and third stage sumps are relatively low. Requiring small/very small producers to install and operate a fixed or floating cover would not be economically feasible because they have much less revenue than large oil producers. The estimated cost effectiveness of a rigid floating cover for a 5,000 square feet second stage sump containing heavy crude oil is about \$64,800 per ton of VOC reduced<sup>5</sup>. The cost effectiveness value for heavy crude oil third stage sump cover would be much higher than for a second stage sump. Due to economic infeasibility, District staff believes the exemption is still appropriate.

The exemptions for minimal VOC emissions (0.007 lb/sq.ft/day) and clean produced water (35 milligrams/liter) are also considered to still be appropriate. It is important to note that the emissions from clean produced water are significantly less than heavy crude. The cost of controlling VOC emissions from clean produced water sumps would be significantly higher than heavy crude oil sumps. Due to economic infeasibility, District staff believes the exemptions in Rule 4402 are appropriate. Based on the discussion above, District staff deems Rule 4402 to satisfy RACT for this category.

## **Conclusion**

District staff concludes that District Rule 4402 satisfies RACT for Crude Oil Production Sumps.

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<sup>5</sup> SBCAPCD Staff Report for Rule 344 (Sumps, Pits, and Well Cellars). Rigid floating cover annualized cost for 5,000 sq.ft. sump is \$78,111 (1986 dollars). Assuming 3% per year consumer price index (inflation rate) for 22 years, the 1986 dollars would be adjusted by an additional 66% to 2008 dollars. The 2008 adjusted annualized cost is \$129,664 [(\$78,111) + (78,111 x 0.66)]. Assuming a VOC emission reduction from heavy crude second stage sump is about 2 tons per year, the cost effectiveness would be \$64,832.

## Rule 4404 – Heavy Oil Test Station - Kern County

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(Source: District 2007 Ozone Plan)

### District Rule 4404 Description

District Rule 4404 controls VOC emissions from operation of heavy oil test stations (HOTS). HOTS is a tank setting comprised of both a family tank and one or more test tanks. A family tank directly receives crude oil production from more than one steam drive well through individual production lines which discharge into the tank. A test tank tests the production rate from a single steam drive well.

Rule 4404 prohibits operation of HOTS unless the VOC emissions are reduced by at least 99%. Except during sampling, gauging, and PV valve vent, any tank roof opening must be equipped with a cover, seal, or lid with no visible gap and maintained in a gas-tight condition.

Requirements of this rule are applicable to heavy oil test stations (HOTS) that are atmospheric tanks. A review of the District's permit database and observations of Compliance Division staff indicate that there are no atmospheric HOTS operating in the District. All HOTS operations are now employing pressure vessels which do not vent to atmosphere. These unvented pressure vessels are exempt from District permitting per section 6.13 of District Rule 2020. Therefore, the VOC emissions from this source category are considered to be zero.

### How does District Rule 4404 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

District staff's review of the EPA CTG list indicates that there is no CTG for HOTS.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for HOTS.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

District staff's review of 40 CFR 60 (Standards of Performance for New Sources) indicates that there is no NSPS for HOTS.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

District staff's review of 40 CFR 61 (NESHAP) and 40 CFR (NESHAP for Source Categories) indicates that there is no NESHAP or MACT for HOTS.

**How does District Rule 4404 compare to rules in other air districts?**

District staff reviewed other nonattainment California air districts' rules (SCAQMD, BAAQMD, SCMAQMD, and VCAPCD) and found that they do not have rules for this source category.

**Conclusion**

Since there are no HOTS currently operating in the District that are subject to requirements of this rule and the VOC emissions from this source category are considered to be zero. Therefore District staff concludes that District Rule 4404 satisfies RACT.

## Rule 4407 – In-Situ Combustion Well Vents

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	0	0	0	0	0	0	0	0

(Source: District 2007 Ozone Plan)

### District Rule 4407 Description

District Rule 4407 controls VOC emissions from in situ-combustion well vents. The rule applies to all crude oil production wells where production has been enhanced by in-situ combustion. In situ-combustion is defined in the rule as a thermal crude oil recovery process in which air is injected into an oil reservoir and in-place petroleum oxidizes at an accelerated rate. The heat of combustion and combustion products enhance oil production by decreasing oil viscosity and pressurizing the reservoir. In situ combustion well is defined in the rule as any crude oil production well which produces from the same zone in which an air injection well is completed and lies within 1,000 feet from an injection well.

District Rule 4407 prohibits operation of any in-situ combustion well unless the well vent is connected to an emission control device which abates 85% by weight of entering VOC gases or is connected to a fuel burning equipment (furnace, boiler, etc.) or a smokeless flare. All components (piping, valves, fittings, pumps, compressors, etc.) should be maintained in good repair and must be inspected for leaks on a quarterly basis. If no more than 2% of all components of the collection system are found to be leaking during each three consecutive quarterly inspections, the inspection frequency may be changed from quarterly to annual. The total number of leaks in a collection system should not exceed 2% of all the components in the collection system. Upon detection of a leak, the operator should affix a visible tag indicating the date of detection of the leak and the tag must remain in place until the leak is repaired. A leaking component must be repaired within 15 days of leak detection, but a 10 day extension to repair a leak may be granted provided the operator demonstrates that necessary and sufficient actions have been taken to correct the leak. Failure to repair a leak after the 10 day extension constitutes a violation of the rule.

District Rule 4407 requires annual testing of the VOC control efficiency of the control and collection system (testing should be conducted during June, July, August, or September each year if the system's control efficiency is dependent upon ambient temperature). The APCO may waive the test requirement if all uncondensed VOC emissions is collected by a collection and control system are burned in fuel burning equipment or a smokeless flare.

Currently, there are no in-situ combustion crude oil wells operating in the San Joaquin Valley Air Basin. A review of the California Division of Oil, Gas, and Geothermal Resources' oil and gas wells database showed that there are only 16 in-situ combustion wells in SJVAB, but all these wells were shut-in (i.e., not producing). Wells that are shut-in do not emit air pollutants; therefore, there are no emissions from this source category.

**How does District Rule 4407 compare with federal rules and regulations?**

**A. EPA – Control Technique Guidelines (CTG)**

District staff's review of the EPA CTG list indicates that there is no CTG for in-situ combustion crude oil wells.

**B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for in-situ combustion crude oil wells.

**C. Standards of Performance for New Stationary Sources (NSPS)**

40 CFR 60 (Standards of Performance for New Sources) does not specify any NSPS for in-situ combustion crude oil wells.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

40 CFR 61 (NESHAP) and 40 CFR (NESHAP for Source Categories) does not specify any NESHAP or MACT for in-situ combustion crude oil wells.

**How does District Rule 4407 compare to rules in other air districts?**

District staff reviewed other California ozone nonattainment air districts' rules (South Coast Air Quality Management District, Bay Area Air Quality Management District, Sacramento Metropolitan Air Quality Management Air District, and Ventura County Air Pollution Control District) and found that other air districts do not have any rules on in-situ combustions crude oil wells.

**Conclusion**

Since there are no federal rules and regulations as well as prohibitory rules in other California nonattainment areas for in-situ-combustion crude oil wells, District staff concludes that District Rule 4407 satisfies RACT.

## Rule 4408 – Glycol Dehydration Systems

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ

The emission inventory for this source category is not available.

### District Rule 4408 Description

Rule 4408, adopted on December 19, 2002, reduces emissions of volatile organic compounds (VOCs) from glycol dehydration systems used on natural gas streams. This rule provides the following three control options.

- Condenser/Vapor Disposal - all uncondensed VOC emissions are directed to a vapor recovery system, a fuel gas system, or a sales gas system.
- Flare/Incinerator - all VOC emissions are combusted by a flare, an incinerator, a reboiler, or a thermal oxidizer.
- Any other system to control VOC emissions by at least 95% or to no higher than 1.7 pounds of VOC emitted per million dry standard cubic feet of gas.

### How does District Rule 4408 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

40 CFR 63 Subpart HH: National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production

For major oil and natural gas production facilities, this subpart requires controls at process vents if actual flowrate of natural gas to the glycol dehydration unit is greater



than 85 thousand m<sup>3</sup>/day, on an annual average basis; or the actual average benzene emissions from the glycol dehydration unit are greater than 0.90 Mg/ yr.

The control system must reduce emissions: (1) by 95.0 percent or more of HAP, or (2) by connecting the process vent to a process natural gas line, or (3) Pollution prevention measures, such as process modifications or combinations of process modifications and one or more control devices that reduce the amount of HAP emissions generated, are allowed as an alternative provided they achieve the required emission reductions. (*CFR Volume 64, Number 116, page 32633*)

The control requirements as described above are the same as required by Rule 4408.

For this subpart controls are required if more than 85 thousand m<sup>3</sup>/day is processed which is equal to 1,095 million standard cubic feet. While Rule 4408 controls required if more than 5 million standard cubic feet of gas processed. Therefore Rule 4408 requirements are more stringent than requirements of 40 CFR 63, subpart HH.

### **How does District Rule 4408 compare to rules in other air districts?**

District staff compared control requirements in District Rule 4408 to comparable requirements in rules from the following California nonattainment areas:

- Ventura County APCD Rule 71.5, as amended December 13, 1994

#### *1. Ventura County APCD Rule 71.5*

Ventura County APCD Rule 71.5 requirements are same as requirements of Rule 4408.

### **Conclusion**

District staff concludes that District Rule 4408 satisfies RACT for Glycol Dehydration Systems.

## Rule 4409 – Components Serving Light Crude Oil or Gases at Light Crude Oil and Gas Production Facilities and Components at Natural Gas Processing Facilities

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	5.0	4.9	4.8	4.7	4.5	4.3	4.3	11.6
VOC* adj	9.943	3.94	3.80	3.76	3.68	3.57	3.47	3.40

\* Emissions inventory does not reflect reductions resulting from recently adopted Rule 4409. This adjustment to the baseline inventory accounts for the 60% reduction from previously controlled emissions level resulting from Rule 4409 implementation effective April 2006.

### District Rule 4409 Description

Rule 4409, adopted on April 20, 2005, concerns fugitive emissions from various components at Light Crude Oil and Gas Production Facilities and Components at Natural Gas Processing Facilities. The main requirement of this rule is to reduce the number and severity of leaking components by regular inspection, repair, and replacement requirements, as well as mandating violations and penalties above certain leak thresholds.

On March 23, 2006, EPA took direct final action to approve revisions to the San Joaquin Valley Unified Air Pollution Control District portion of the California State Implementation Plan. These revisions included approval of District Rule 4409. EPA, in evaluating and approving Rule 4409 included the following:

“We believe these rules are consistent with the relevant policy and guidance regarding enforceability, RACT, and SIP relaxations.” (*CFR Volume 71, Number 56*)

Since Rule 4409 was approved by EPA as meeting RACT requirements, the District did not pursue a detailed RACT analysis.

### How does District Rule 4409 compare with federal rules and regulations?

The District did not conduct a detailed analysis of federal rules and regulations for Rule 4409.

**How does District Rule 4409 compare to rules in other air districts?**

The District did not conduct a detailed comparison to rules in other air districts for Rule 4409.

**Conclusion**

District staff concludes that District Rule 4409 satisfies RACT for Components Serving Light Crude Oil or Gases at Light Crude Oil and Gas Production Facilities and Components at Natural Gas Processing Facilities.

## Rule 4453 – Refinery Vacuum Producing Devices or Systems

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ

(Source: District 2007 Ozone Plan)

### District Rule 4453 Description

Rule 4453, amended on December 17, 1992, applies to any vacuum producing device or system, including hot wells and accumulators in a refinery. The rule requires hot wells and accumulators to be covered. In addition, the rule requires the vapors from vacuum producing devices or systems, hot wells, and accumulators to be compressed and added to refinery gas, controlled and combusted to a firebox or incinerator with at least 90% VOC control efficiency, or controlled by other methods approved by the APCO.

### How does District Rule 4453 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

EPA-450/2-77-025 (Control of Refinery Vacuum Producing Systems, Water Separators and Process Unit Turnarounds), October 1977, indicates that RACT requires non-condensable vapors from vacuum producing systems be combusted in a firebox. Also, process units should be depressurized to a flare, fuel gas system, or other combustion device before being opened for inspection or maintenance. The District Rule 4453 requirements are as stringent as the CTG.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for refinery vacuum producing device or system.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

District staff's review of 40 CFR 60 (Standards of Performance for New Sources) indicates that there is no NSPS for refinery vacuum producing device or system.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

40 CFR 63 Subpart CC (NESHAP from Petroleum Refineries) does not have specific control requirements for refinery vacuum producing devices or systems.

**How does District Rule 4453 compare to rules in other air districts?**

District staff compared District Rule 4402 with the rules of other California ozone nonattainment air districts' rules (South Coast Air Quality Management District, Bay Area Air Quality Management District, Sacramento Metropolitan Air Quality Management Air District, and Ventura County Air Pollution Control District) on open burning. The results of the analysis are discussed below.

**A. SCAQMD Rule 465 (Refinery Vacuum-Producing Devices or Systems) amended August 13, 1999**

SCAQMD Rule 465 requires hot wells and accumulators to be equipped with covers. Rule 465 also requires the exhaust gases from vacuum-producing devices or systems, including hot wells and accumulators to be continuously collected and added to a fuel system or a combustion device. In comparison, Rule 4453 requires hot wells and accumulators to be covered, and the vapors from vacuum producing devices or systems, hot wells, and accumulators have to be compressed and added to refinery gas, controlled and combusted to a firebox or incinerator with at least 90% VOC control efficiency. Based on this evaluation District staff deems Rule 4453 is as stringent as SCAQMD Rule 465.

**B. BAAQMD Regulation 8, Rule 9 (Vacuum Producing Systems) amended July,20,1983**

BAAQMD Regulation 8, Rule 9 requires hot wells and accumulators to be covered and the organic vapors must be incinerated or treated so as to prevent their emission into the atmosphere. The rule also requires the non-condensable organic emissions from vacuum producing systems to be controlled and piped to an appropriate firebox or incinerator for combustion, or collected, compressed, and added to the fuel gas system, or be contained and treated so as to prevent their emission into the atmosphere. In comparison, Rule 4453 requires hot wells and accumulators to be covered, and the vapors from vacuum producing devices or systems, hot wells, and accumulators have to be compressed and added to refinery gas, controlled and combusted to a firebox or incinerator with at least 90% VOC control efficiency. Based on this evaluation District staff deems Rule 4453 is as stringent as BAAQMD Regulation 8, Rule 9.

**C. VCAPCD Rule 74.8 (Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds) amended July 5, 1983**

VCAPCD Rule 74.8 requires all uncondensed organic vapors emitted from vacuum producing systems to be contained and piped the vapors to a firebox, a flare, or added to refinery fuel gas or feedbacks. In comparison, Rule 4453 requires hot wells and accumulators to be covered, and the vapors from vacuum producing devices or systems, hot wells, and accumulators have to be compressed and added to refinery gas, controlled and combusted to a firebox or incinerator with at least 90% VOC control efficiency. Based on this evaluation District staff deems Rule 4453 is as stringent as VCAPCD Rule 74.8.

**D. Sacramento AQMD has no rule for this source category.**

**Conclusion**

District staff concludes that District Rule 4453 satisfies RACT for Refinery Vacuum Producing Devices or Systems.

## Rule 4454 – Refinery Process Unit Turnaround

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ

(Source: District 2007 Ozone Plan)

### District Rule 4454 Description

Rule 4454 applies to any refinery vessel containing VOC. The rule exempts any process vessel that has been depressurized to less than five psig (1020 mm Hg). The rule requires VOC-containing vessels to be depressurized to less than 5 psig or as close to atmospheric pressure as possible, and the recovered vapors must be directed to a fuel gas system, incinerator, or a flare for combustion before venting/opening to the atmosphere.

### How does District Rule 4454 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

EPA-450/2-77-025 (Control of Refinery Vacuum Producing Systems, Water Separators and Process Unit Turnarounds), October 1977, indicates that RACT requires process units to be as close to atmospheric pressure as practicable as possible. The CTG indicated that most refineries should easily depressurize processing units to 5 psig or below before venting to the atmosphere. Atmospheric emissions will be greatly reduced if vapors are combusted as fuel gas or flared until the pressure in the vessel is as close to atmospheric. The District Rule 4454 requirements are as stringent as the CTG.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for refinery process unit turnarounds.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

District staff's review of 40 CFR 60 (Standards of Performance for New Sources) indicates that there is no NSPS for refinery process unit turnarounds.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

40 CFR 63 Subpart CC (NESHAP from Petroleum Refineries) does not have specific control requirements for refinery process unit turnarounds.

**How does District Rule 4454 compare to rules in other air districts?**

District staff reviewed other nonattainment California air districts' rules (South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD), Sacramento Air Quality Management District (SMAQMD) and Ventura County Air Pollution Control District (VCAPCD) that control the VOC emissions from depressurizing process vessels as discussed below.

**A. SCAQMD Rule 1123 (Refinery Process Turnarounds), amended December 12, 1990**

SCAQMD Rule 1123 prohibits depressurizing any vessel containing organic materials unless the vapors released from the vessel are collected and contained for use as fuel or sent to a gas disposal system until the pressure in the vessel is below 5 psig, or is within 10 percent above minimum gauge pressure at which the vapors can be collected, whichever is lower. If inert gas displacement or vacuum eduction is used for process turnaround, an operator has to submit a plan to the executive officer for approval which describes at a least the following: the procedure used for gas displacement or eduction; the disposition of the displaced or educed organic gases, the stage in the displacement or eduction procedure at which disposition is changed from control facility to atmospheric venting; and the criteria by which said stage is identifiable.

**B. BAAQMD Regulation 8, Rule 10 (Organic Compounds - Process Vessel Depressurization), amended January 21, 2004**

BAAQMD Regulation 8, Rule 10 requires organic compounds emissions from depressurizing any process vessel to be controlled by venting them to a fuel gas system, firebox, incinerator, thermal oxidizer, flare or containing and treating them so as to prevent their emissions into the atmosphere. The depressurizing procedure should continue until the pressure within a process vessel is as close to atmospheric pressure as practically possible, in no case should a process vessel be vented to the atmosphere until the partial pressure of the organic compounds in the vessel is less than 1,000 mm Hg (4.6 psig). The rule prohibits opening a process vessel to the atmosphere unless the internal concentration of total organic compounds has been reduced to less than 10,000 ppm expressed as methane. However, a process vessels may be opened to the atmosphere when the internal pressure is 10,000 ppm or greater if the total number of vessels opened with such concentration during any five consecutive years does not exceed 10% of the total vessel population and the organic compound emissions do not exceed 15 pounds/day.



Although Rule 4454 does not have a requirement like BAAQMD Regulation 8, Rule 10 that prohibits opening a process vessel to the atmosphere unless the internal concentration of total organic compounds has been reduced to less than 10,000 ppmv, based on District's staff field inspection experience and observations, operators would not start opening a process vessel for inspection or maintenance unless the internal vapor concentration is less than 5,000 ppmv or less than 10% of the lower explosive limit (LEL) for safety reasons in order to comply with applicable OSHA regulations. Additionally, such vessel is also considered a tank as defined in Rule 4623 (Storage of Organic Liquid) and is subject to the more stringent degassing provisions which require the vessel to be degassed to less than 5,000 ppmv or less than 10% of the LEL, whichever is lower. As such, the process vessel depressurization requirements of Rule 4454 in conjunction with the degassing control requirements of Rule 4623 are more effective than other air districts' rules.

**C. VCAPCD Rule 74.8 (Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds), amended July 5, 1983**

VCAPCD Rule 74.8 prohibits venting organic compounds to the atmosphere during depressurization or the vessel purging steps of a refinery process turnaround. All uncondensed organic gases should be vented to a fuel gas system or to a flare, or other methods which district has determined will prevent said gases from being emitted into the atmosphere.

**D. Sacramento AQMD has no rule for this source category.**

**Conclusion**

District staff concludes that District Rule 4454 satisfies RACT for Refinery Process Unit Turnaround.

## Rule 4455 – Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.190
VOC* adj	0.233	0.026	0.026	0.026	0.026	0.026	0.026	0.026

\* Emissions inventory does not reflect reductions resulting from recently adopted Rule 4455. The adjusted inventory accounts for the 89% reduction from previously controlled emissions level resulting from Rule 4455 implementation effective April 2006.

### District Rule 4455 Description

Rule 4455, adopted on April 20, 2005, concerns fugitive emissions from various components at petroleum refineries and chemical plants. The main requirement of this rule is to reduce the number and severity of leaking components by regular inspection, repair, and replacement requirements, as well as mandating violations and penalties above certain leak thresholds.

On March 23, 2006 EPA took direct final action to approve revisions to the San Joaquin Valley Unified Air Pollution Control District portion of the California State Implementation Plan. These revisions included approval of District Rule 4455. EPA, in evaluating and approving Rule 4455 included the following:

“We believe these rules are consistent with the relevant policy and guidance regarding enforceability, RACT, and SIP relaxations.” (*CFR Volume 71, Number 56*)

Since Rule 4455 was approved by EPA as meeting RACT requirements, the District did not pursue a detailed RACT analysis.

### How does District Rule 4455 compare with federal rules and regulations?

The District did not conduct a detailed analysis of federal rules and regulations for Rule 4455.

### How does District Rule 4455 compare to rules in other air districts?

The District did not conduct a detailed comparison to rules in other air districts for Rule 4455.

**Conclusion**

District staff concludes that District Rule 4455 satisfies RACT for Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants.

## Rule 4565 - Biosolids, Animal Manure, and Poultry Litter Operations

### Emissions Inventory:

Tons per day - summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	9.7	9.8	9.9	10.0	10.1	10.2	10.3	10.4

(Source: District 2007 Ozone Plan)

### District Rule 4565 Description

District Rule 4565, recently adopted on March 15, 2007, to limit VOC emissions from facilities whose throughput consists entirely or part of biosolids, animal manure, or poultry litter and the operator who landfills, land applies, composts, or co-composts these materials. Sewage treatment plants or other wastewater treatment facilities are not subject to this rule unless the operator landfills, land applies, composts, or co-composts the treated material (biosolids) on site.

### How does District Rule 4565 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no EPA CTG guidance document for biosolids, animal manure, and/or poultry litter operations.

#### **B. EPA - Alternative Control Technology (ACT)**

There is no EPA ACT guidance document for biosolids, animal manure, and/or poultry litter operations.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS guidance document for biosolids, animal manure, and/or poultry litter operations.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NSPS guidance document for biosolids, animal manure, and/or poultry litter operations.

### How does District Rule 4565 compare to rules in other air districts?

District staff compared VOC limits, optional control requirements, and work practice

standards in District Rule 4565 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1133.2 - Emission Reductions from Co-Composting Operations (Adopted January 10, 2003)
- Bay Area AQMD, Sacramento Metropolitan AQMD and Ventura County APCD do not have rules that apply to composting or co-composting operations.

**South Coast Air Quality Management District (SCAQMD) Rule 1133.2 (Emission Reductions from Co-Composting Operations)**

SCAQMD Rule 1133.2 applies to all new and existing co-composting operations.

Staff notes that there are some significant differences between District Rule 4565 and SCAQMD Rule 1133.2. This should not be interpreted to mean that one rule is more stringent than the other, but due instead to the following factors:

1. Technology has changed significantly since SCAQMD Rule 1133.2 was adopted;
2. Additional research projects regarding mitigation measures have been completed since SCAQMD Rule 1133.2 was adopted; and
3. The socioeconomic climate of the SCAQMD is significantly different from that of the District.

The table below summarizes the significant differences between SCAQMD Rule 1133.2 and SJVUAPCD Rule 4565. Below are the important differences between the two rules.

Category	SCAQMD Rule 1133.2	SJVUAPCD Rule 4565	Reason
	Rule does not apply to these operations	Management practice requirements	Knowledge of VOC control options has increased since Rule 1133.2 adoption and staff believes that cost-effective methods of controlling VOC emissions from these facilities exist.
Co-Composting Threshold for Applicability	Facilities with at least 1,000 tpy throughput	Facilities that handle 100 tpy or more of biosolids, animal manure, or poultry litter	Staff believes that there are reasonable, cost effective options for facilities with throughputs of $\geq 100$ tpy that would not impose an undue burden on operators.
Composting Control Requirements	In-vessel composting with 70 – 80% VOC control efficiency	VOC control efficiency 10% - 80% depending on type of operation and facility throughput	Management practices (mitigation measures) are effective, reasonable, and have been achieved in practice for smaller facilities.  In-vessel composting is not cost-effective for smaller or medium facilities and there are no known, unsubsidized facilities in the SCAQMD that would comply with such rule requirements.

Furthermore, in order to acknowledge that some VOC mitigation measures are only cost-effective for larger facilities, SJVAPCD staff developed the concept of Class One and Class Two mitigation measures. Class One mitigation measures are considered BARCT and cost-effective options for all facilities, regardless of size. These measures are management practices found to be best practices for all composting operations.

Class Two mitigation measures are the technology options and achieve reductions greater than Class One mitigation measures, however they are not cost effective for facilities with throughputs of less than 100,000 wet tons per year (see Appendix C of the Final Rule 4565 Draft Staff Report details the costs and cost effectiveness analysis).

SJVAPCD Rule 4565 requires reductions from two addition categories (landfilling and land applying) when compared to SCAQMD Rule 1133.2. For the third category, composting, SJVAPCD staff determined it is not cost effective to require in-vessel (enclosed) composting.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4565 satisfies RACT for biosolids, animal manure, and poultry litter operations.

## Rule 4570 – Confined Animal Facilities

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC without 4570	65.4	68.7	72.5	74.0	76.9	81.4	85.9	90.4
VOC *adjusted	65	68	53	55	57	60	64	67

\*Baseline adjusted to reflect recently adopted Rule 4570 reductions & current estimated control efficiencies.

*Note: The RACT analysis for Rule 4570 follows a different format due to the innovative nature of the rule.*

### 1. BACKGROUND – CONFINED ANIMAL FACILITIES IN THE SAN JOAQUIN VALLEY

Confined Animal Facilities are used for the raising of animals including, but not limited to, cattle, calves, chickens, ducks, goats, horses, sheep, swine, rabbits, and turkeys, which are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and fed by a means other than grazing. (CH&SC 39011.5 (a)(1))

#### 1.1. TYPES OF CONFINED ANIMAL FACILITIES

##### 1.1.1 INDUSTRIES THAT USE CAFs

Confined animal facilities are used in the raising of livestock for the purpose of providing dairy products, meat, and eggs. The raising of livestock (livestock agriculture) has gone through significant changes since the 1990s. Today, meat and dairy products typically originate on farms whose herds of cattle or hogs, or flocks of chickens are much larger than in the past. These farms usually house a single species in buildings or open-air pens, and provide them with feed that has been purchased rather than grown onsite. While most such farms are still family-owned and operated, they rely heavily on hired labor and are tightly linked to other stages of production and processing through formal contracts, alliances, and joint financing or common ownership of assets.<sup>1</sup>

The growth of all types of livestock agriculture farms continues to increase. A big driver in the structural change in livestock agriculture is increased productivity and, through that, lower production costs to the farmer. The largest dairy farms (1,000+ head) have production costs that are 15% lower than the next largest size class (500-999 head). This kind of production cost-saving is also true of layers (chickens raised to lay eggs), broilers (chickens raised for meat), hog, and beef producers. For livestock agriculture, evidence to-date suggests that production costs fall as the farm size increases up to some threshold level. Production costs then level out, meaning that there is no unique optimal size. Dairies with 2,000 cows have average costs similar to dairies with 1,000

cows, for example. Therefore, these livestock operations can get quite large without experiencing increased production costs from being “overly” large.

One example of the shift to large-scale production is the dairy industry. Nationally, only about 10% of all dairy cows were housed on farms with more than 1,000 head in 1992. By 2007, that ratio rose to 36% of all dairy cows. The shift to very-large dairies (1,000+ head) had its origin in California and other western states. Looking at California specifically, the state has become the largest producer of milk in the nation. The eight counties of the San Joaquin Valley are all in the top-ten California counties for milk production, with Tulare County heading the list. Tulare County alone produced almost as much milk as the entire state of Pennsylvania, the state ranked number five on the 2007 list of top milk-producing states and Tulare County was well ahead of Minnesota, the sixth largest milk producing state.

The State of California tracks the number of dairies and the number of dairy cows by county. By dividing the number of cows by the number of dairies, the average number of cows per dairy for each county is determined. The simple math done by the state does not reveal the extent to which larger dairies have appeared in the District. The SCAQMD Staff Report for the adoption of Rule 223 points out the relative contribution of all CAFs to the South Coast emissions inventory in the near future is expected to be significantly lower than what the current figures indicate.<sup>6</sup> Consistent with the assumptions made by SCAQMD, many dairies have already moved to the San Joaquin Valley (SJV). Much of this is due to the encroachment of residential areas close to South Coast CAF operations. That, coupled with the less-expensive land in the Valley and proximity to the Greater Los Angeles market, makes the SJV the perfect destination for dairies from the South Coast air basin. Kern County is about 50 minutes away from the Greater Los Angeles area and has direct access via Interstate 5 and California State Route 99. The county with the highest head-per-dairy in 2007 was Kern County with an average of 3,137 head per dairy, up 50% from the 2002 level of 2,093 head per dairy.

Although dairies are notable in their shift to large-scale production, other types of livestock agriculture have also increased the average farm size. Nationally, the median production of broilers (50% larger and 50% smaller) is 600,000 broilers per year. In 2002, the median production was 520,000. Active District permits echo this national trend.

### 1.1.2 MAJOR CAF CATEGORIES

Industries employing confined animal facilities (CAFs) provide several major nutritional commodities, including dairy products, meat, and eggs. There are many different types of CAFs in the San Joaquin valley. The major categories are described below.

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<sup>6</sup> Page 7 of the SCAQMD Staff Report Rule 223



### 1.1.2.1 Dairy Operations

Dairy operations are defined as those operations producing milk or animals for facilities that produce milk. In order to produce milk, the cows must be bred and give birth. Typically, the gestation period for dairy cattle is nine (9) months and dairy cows are bred again approximately four (4) months after calving. Milk production typically peaks shortly after calving and then declines. Commonly a cow will produce milk for ten (10) to twelve (12) months and then be dry approximately two (2) months. Thus, a dairy operation may have several types of animal groups present including heifers, lactating cows, dry cows, calves, and bulls (for breeding purposes). Approximately 25% of a milking herd is replaced each year, but replacement levels can be as high as 40% for intensively managed herds (EPA 2001).

Feeding and watering practices vary for each animal type. In general, calves are nursed for four (4) to five (5) days after birth. Calves are then fed a milk replacement until weaning, which generally occurs at about eight (8) weeks of age. During this period, a feed grain based starter diet is introduced. This starter diet is fed to calves until they are approximately three (3) months old. At approximately three (3) months, calf rumen development allows a shift to a roughage-based diet.

Older cattle and calves being raised for milk production are commonly fed a roughage-based diet. The principal constituents of these diets are corn or grain sorghum silage and legume or grass and legume hays with feed grains and byproduct foodstuff added in varying amounts to satisfy energy, protein, and other nutrient requirements. The manure tends to be generated in a semi-solid state.

### 1.1.2.2 Poultry Operations

Poultry facilities operate either as layer ranches for egg production or as broiler ranches where birds are grown for the fresh meat market. Poultry facilities, called ranches in reference to their specialized operation, may consist of one or more farms on properties that may be several miles apart. Several barn-like houses may make up a farm. A chicken layer house may have over 100,000 layers; a typical chicken broiler house contains approximately 20,000-25,000 birds; and a typical turkey broiler house contains approximately 10,000 birds at any one time.

### 1.1.2.3 Beef Cattle Feeding Operations

This animal sector includes adult beef cattle (heifers and steers). Beef cattle may spend all, part, or none of their lives on a CAF. There are three types of operations in the beef industry: cow-calf operations, backgrounding operations, and finishing operations. These operations are typically conducted at separate locations that specialize in each phase of production, but may occur at a single location.

Cow-calf operations are a source of heifers and steers fed for slaughter. These animals are fed primarily hay with some grain and other foodstuff. Backgrounding or stocker

operations prepare weaned calves for finishing. The backgrounding process is highly dependent on feed prices. Typically the animals are fed the lowest priced feed at the time, which may be forages or crop residues, with the objective of building muscle and bone mass at a low cost. The duration of the backgrounding process may be from thirty (30) days to six (6) months old. Typically, high grain prices favor longer periods of backgrounding by reducing feed costs for finishing or fattening. After approximately 150 to 180 days, animals in finishing operations will reach slaughter weights of 1,050 to 1,250 pounds. Although, some feedlots start with younger or older cattle and the finishing cycle may be less than 100 days or over 270 days. Accordingly, feedlots typically have between 1.5 to 3.5 cattle turnovers per year.

In any case, animals are typically segregated by production stage in pens with feed truck access. The animals are typically fed two (2) to three (3) times per day using feed bunks located along feed alleys that separate the individual pens.

#### **1.1.2.4 Swine Operations**

The production cycle for hogs has three (3) phases: farrowing, nursing, and finishing. The first phase begins with breeding and gestation over a 114-day period followed by farrowing (giving birth). After farrowing, the newly born pigs or piglets normally are nursed for a period of three (3) to four (4) weeks until they reach a weight of approximately ten (10) to fifteen (15) pounds. Typically, there are from nine (9) to eleven (11) pigs per litter. Sows can be bred again within a week after a litter is weaned. Sows normally produce five (5) to six (6) litters before they are sold for slaughter at a weight of 400 to 460 pounds.

Weaned pigs are fed a starter ration until they reach a weight of approximately fifty (50) to sixty (60) pounds. At this point, they are typically eight (8) to ten (10) weeks of age. Then the animals are fed a growing and finally a finishing ration until they are approximately 240 to 280 pounds at which point they are approximately 26 weeks of age and ready for slaughter. The diet varies, but it typically includes small grains such as wheat and barley, corn and soybean meal.

#### **1.1.3 VARIETY OF CAFS**

CAFs can vary significantly in size from one CAF to another (e.g., dairy to feedlots, poultry, etc.) and within the same category of CAFs (dairy to dairy). For example, a dairy can be as small as 10 acres to well over 100 acres, depending on the number and types of cows on the facility. The majority of the sources on a dairy or a cattle facility are large open areas and cannot be easily controlled, specifically by a single control device. Dairies cannot be compared to feedlot cattle nor can either be compared to poultry operations. Poultry operations, even within themselves have many different characteristics and practices.

Due to the different methods of confinement and associated manure management, there is no typical CAF. The design and operation of a CAF varies depending on animal

type, regional climatic conditions, business practices, and preferences of the owners/operators. Not all of the mitigation measures included as an option in Rule 4570 can be reasonably adopted by all facilities due to infrastructure, conditional use permits, water board permits, soil types, production contracts, and other limitations.

A description of the different types of housing and management systems are described below:

### **1.1.3.1 Dairy Cattle Manure Management**

#### **1.1.3.1.1 Flush**

The vast majority of the dairy cows in the Valley are located at dairies with a flush manure management system, which removes the manure by using a flushing system. A large volume of water is introduced at the head of a paved area, and the cascading water removes the manure. Flush water can be introduced from storage tanks or high-volume pumps. The required volume of flush water varies with the size of the area to be flushed and slope of the area. In a flush system, the manure generated by the cows next to the freestalls (near the feed lanes) is flushed by large amounts of water a few times a day generally to the lagoon. The lagoon serves as the basis of holding and decomposing the manure.

#### **1.1.3.1.2 Scrape**

Scrape manure management removes the manure and bedding from the barns and pens by a tractor or a mechanical scraper. Scrape manure management dairies may also have a mechanical alley scraper that consists of one or more blades that are wide enough to scrape the entire alley in one pass. A timer can be set so that the scraper runs two to four times a day. Scrapers reduce daily labor requirements, but have a higher maintenance cost due to corrosion and deterioration.

The rate of manure accumulation in drylots (open corrals) and pens for the cattle is highest along feed bunks and watering troughs and therefore these areas will be scraped more frequently than other areas. These areas are usually paved with concrete.

#### **1.1.3.1.3 Vacuum**

There is a small percentage of dairies that utilize a vacuum system to collect as excreted manure with a vacuum truck. Generally, the trucks collect approximately 4,000 gallons per load. The manure can be hauled to a disposal site rather than to an intermediate sump. Vacuum collection is a slow and tedious process. The advantage is that the collected manure is undiluted and approximately equal to the as excreted concentration and can be applied directly to land. Generally no lagoons are needed for this type of system, however there may be a need to maintain slurry pits if the facility does not have sufficient land available.

### **1.1.3.2 Dairy Cattle Housing and Manure Management**

Majority of Milk cows in the Valley are housed in freestalls while the vast majority of other cows (dry cows and heifers) are housed in open corrals. However, dairies may have a single type of housing or consist of both types of housing. Baby calves are generally housed in calf hutches, but vary in type (aboveground or on-ground). A brief description of each of the types of housing is included below:

#### **1.1.3.2.1 Freestalls**

In the freestall barn cows are grouped in large pens with free access to feed bunks, waterers, and stalls for resting. A standard free-stall barn design has a feed alley in the center of the barn separating two feed bunks on each side. Animals stand on the concrete feed lane to eat; this is where the majority of the animal excretion occurs. A variety of types of bedding materials are used for animal comfort and to prevent animal injury.

#### **1.1.3.2.2 Open Corrals (drylots)**

An open corral is a large open area (fenced in) where cows are confined, with unlimited access to feed bunks, water, and possibly an open structure to provide shade.

#### **1.1.3.2.3 Special Needs Housing**

The special needs area serves the gestating cows at the dairy or any cow that may have a medical condition. This area acts as a veterinary area and gives the cows special attention as they move from dry cow (a mature cow that is gestating but not lactating) to maternity to milking status or until their health improves.

#### **1.1.3.2.4 Calf Housing**

The calves are generally housed individually until they are ready to wean (to accustom to take nourishment other than by suckling).

### **1.1.3.3 Feedlot Cattle Housing and Manure Management**

Feedlot cattle are segregated in pens designed for efficient movement of cattle, optimum drainage, and easy feed truck access. Pens are large open areas where cattle are confined, with unlimited access to feed bunks, water, and possibly an open structure to provide shade. A typical pen holds 150-300 head of cattle but the size can vary substantially. Required pen space may range from 75 to 400 square feet of pen space per head, depending on the climate. A dry climate requires 75 square feet of pen space per head whereas a wet climate may require up to 400 square feet (Thompson, O'Mary, 1983). Space needs vary with the amount of paved space, soil type, drainage, annual rainfall, and freezing and thawing cycles. These types of operations may use mounds to

improve drainage and provide areas that dry quickly, since dry resting areas improve cattle comfort, health, and feed utilization.

For these types of operations, the manure is commonly handled as a solid. Solid manure is typically scraped or moved by tractors to stockpiles. Manure accumulates in areas around feed bunks and water troughs most rapidly, thus these areas may need to be cleaned during the finisher cycle. However, there is significant concern and risks associated with entering areas where beef cattle are housed.

#### **1.1.3.4 Poultry Housing and Manure Management**

In the United States, approximately 61% of the chicken layer houses and a majority of the breeder and broiler houses use power ventilation instead of natural ventilation. The most common type of power ventilation is tunnel ventilation. In tunnel-ventilated houses, all the fans are clustered at one end of the house and the fans push the air to the other end of the house. Curtains on the houses may be used on a non-routine basis for ventilation, particularly during colder weather.

Studies indicate that most chicken layer houses produce approximately two cubic yards of waste per week per five hundred chickens. Although a small amount of liquid waste may occur from egg washing operations located on the facility and a small amount of bedding may be collected as waste, poultry excretions account for a majority of the waste. Typically, hens are confined in a layer house that consists of many layer boxes positioned above the ground. On average, every seven (7) to nine (9) days workers remove waste from under the layer boxes, and every fourteen (14) to eighteen (18) weeks workers remove waste from the floor of the layer houses. However, many facilities list less frequent waste removal, ranging from one (1) to three (3) times per year (every 17-52 weeks) as a control technique used to comply with District Rule 4550 Conservation Management Plan (CMP). Several mitigation measures in Proposed Rule 4570 and Rule 4550 that the owners/operators could choose do not affect waste removal frequency. Therefore, owners/operators can comply with both Rule 4550 and 4570.

In broiler facilities, complete litter removal from the house occurs one (1) to four (4) times per year. Litter removal frequencies vary from every two (2) to seven (7) flocks (approximately 90-315 days); more commonly, it is removed every third flock. Before introducing a new flock, the house is left empty, typically for five (5) days. During this interlude, the operator adjusts the temperature and other ambient conditions in the house. In the broiler industry, the new flocks of birds are brought into the houses as chicks and are raised for approximately 45 days, until they reach the desired weight. Shortly thereafter, the grown birds are removed and the house is again left empty for approximately five (5) days to sanitize. This approximately 55-day cycle is the production period for one flock. Depending on management practices, litter production ranges from 0.5 to 0.7 pounds per pound of live bird weight. On average, for each pound of live weight gained, meat birds produced 0.52 pounds of litter during the production period.

Poultry excretions and bedding materials, such as rice hulls, are removed either by scraping or by flushing. In a scrape system, the litter is either swept or scraped from the house into a pile or piles outside the house. Typically, concerns about transmitting diseases among birds and flocks necessitate trucking the scraped litter offsite shortly after removal. The liquid handling system is similar to dairy flush systems, explained later in this report. However, less than 15% of the poultry operations in the San Joaquin Valley use liquid manure handling systems.

#### **1.1.3.5 Swine Housing and Manure Management**

The animals are typically housed in confinement buildings that are either totally enclosed or open-sided with curtains. Totally enclosed facilities are mechanically ventilated throughout the year. Open-sided buildings are naturally ventilated the majority of the year, but may be mechanically ventilated when the curtains are closed due to weather conditions. Manure may be flushed from the floor of the housing or fall through slats in the floor to a pit underneath the floor. Manure in the pit may be flushed or scraped.

#### **1.1.3.6 Miscellaneous Emission Units at CAFs**

##### **1.1.3.6.1 Manure Stock Piles-Storage**

Almost all cattle facilities maintain uncovered storage stockpiles. Because open piles are subjected to rain, they exhibit emission profiles of both aerobic and anaerobic conditions over time. When stacked for storage, a significant increase in temperature may occur depending on moisture content due to microbial heat production.

##### **1.1.3.6.2 Storage Ponds**

Manure with a total solid content of 10% or less can be handled as a liquid. In slurry or liquid systems, the manure is flushed from alleys or pits to a storage facility. A flush manure management needs a place to flush the manure to and generally consist of small to very large basin(s) designed for temporary collection and storage of their organic waste. Storage ponds are not designed to treat waste but to simply store it or hold it. Storage ponds may completely be emptied when pumped, and the design storage periods are about 90 to 180 days.

##### **1.1.3.6.3 Land Application of Animal Waste**

Liquid manure from flush systems stored in lagoons or solid manure scraped from facilities eventually may be land applied with or without prior treatment such as composting or anaerobic digestion. Typically, animal waste is applied to cropland at rates adequate to supply crop nutrient needs. Historically the determination of application rates has been based on crop nitrogen requirements due to concern about the impact of excess nitrogen on surface and ground water. In cases where treatment

methods, such as aerobic digestion, increase the nitrate content in the waste stream, the waste may need to be applied over a greater number of acres in order to comply with the Regional Water Quality Board's regulations.

Surface application of manure waste may be done with a spreading device known as a box manure spreader. This is simply a rectangular box that is either tractor drawn or truck mounted with a spreading device at the rear end. During spreading, the manure moves to the rear of the box by either a belt or chain-and flight conveyor. Box type spreaders are typically loaded with tractor mounted front-end loaders. Manure handled as slurry or liquid may be spread with a tractor drawn or truck mounted tank known as a liquid manure spreader. The manure may be forced out of the tank under pressure against a distribution plate to create a spray pattern. Another option is to force the manure from the tank under pressure through a manifold with a series of hanging or trailing pipes to create parallel strips of manure on the soil surface. A second type of spreader for manure slurries is a flail spreader. This is a partially open tank with chains attached to a rotating shaft positioned parallel to the direction of travel. Manure is discharged perpendicular to the direction of travel by the momentum transferred from rotating chains.

Manure may be land applied and land incorporated through the use of a manure injection device, typically attached to a tractor; tilling surface applied manure under the soil; applying liquid manure at such a rate that is rapidly absorbed into the soil; or another method in which the manure is covered with soil.

Facilities choosing to use conservation tillage options will likely apply any liquid manure at a rate such that it is rapidly absorbed into the soil and apply any solid manure only after it has been treated with an anaerobic digestion process, treated with an aerobic digestion process, or dried to a moisture content of less than 50%. In any of these cases the animal waste land applied would not need to be tilled under the soil in order to comply with rule requirements. Similarly, such methods may be used when crop height prevents the owner/operator from tilling the land-applied waste.

#### **1.1.3.6.4 Windrow Composting**

Some dairies in the Valley also compost the manure generated from their facility. Composting is the aerobic decomposition of manure or other organic materials in the thermophilic temperature range (104 -149 degrees F). It is the same process that decays leaves and other organic debris in nature. Composting merely controls conditions so that materials decompose faster. Composting is generally performed through windrow compost piles. A windrow process involves forming long piles turned by specially designed machines. Typically the rows are 1 to 2 meters high and 2 to 5 meters at the base. The piles are turned periodically to mix and introduce and rebuild bed porosity. This helps to insure that all the material is uniformly composted.

Composting improves the handling characteristics of any organic residue by reducing its volume and weight. Composting also kills pathogens and weed seeds. Composting

reduces material volume through natural biological action and produces a product that enhances soil structure and benefits new growth. However, windrow composting operations also result in significant VOC emissions.

## **1.2 EMISSION FACTORS AND EMISSION INVENTORY**

### **1.2.1 BIOLOGICAL PROCESSES ARE COMPLEX, NOT WELL-UNDERSTOOD**

Unlike other traditional stationary sources (many of which are combustion sources for which there is a very good understanding of emissions), agriculture sources are biological sources that consist of hundreds of different VOCs among other major pollutants. Perhaps the most important finding of all is that CAFs are extraordinarily complex sources of air emissions, varying not only season to season, but from CAF to CAF, and from place to place within a CAF. Emissions can vary substantially depending on weather, types of feed, and management styles along with many other factors. The same methodologies and standards used to establish emissions from traditional stationary sources cannot be used in determining the emissions from CAFs. Development of strategies to reduce environmental impacts of animal agriculture requires a better understanding of the mechanisms involved in the production, emission, and consumption of ammonia, odors, and greenhouse gases. In order to understand and ultimately reduce the negative impacts of these gaseous emissions, it is important to understand the circumstances under which they form. Understanding the sources and mechanisms of these emissions is a first step to developing effective control strategies.

However, as discussed earlier, prior to January 1, 2004, the only available emission factor for dairies, swine, rabbits, horses, sheep, and goats was based on a metabolism study conducted in 1938 by Benedict and Ritzman. No other data was available at that time. Since 2004, multiple studies have been performed, each subsequent study providing more insight into how the biology of the animals and their waste plays a large role in emission production. Although numerous studies have been completed in evaluating the emissions profile from CAFs and a significant amount has been learned through this process, much is still not well understood. Each new study performed sheds new light in regards to how the different biological factors effect emissions.

### **1.2.2 STATE OF THE SCIENCE**

Due to the relatively new status of CAFs as a regulated stationary source, the body of scientific knowledge that is useful in understanding CAFs' impact on air pollution is not as well established compared to other traditional stationary sources under the jurisdiction of the District. Even after the adoption of Rule 4570, the science significantly lags in comparison to other stationary sources. New scientific findings characterizing and quantifying dairy, poultry, and other animal emissions and possible control measures are still being developed and completed. The District developed Rule



4570 using relevant findings from previous and on-going research efforts as they were finalized, published, and peer-reviewed. These include, but are not limited to:

- A study at UC Davis, led by Dr. Frank Mitloehner, which focused on emissions from cows housed in environmental chambers to evaluate the emissions produced directly from cows and their fresh manure.
- A study at two operating dairies in the San Joaquin Valley, led by Dr. Chuck Schmidt, in which measurements were made at various locations at the dairies, including the corrals and turnouts, bedding areas, lagoons, feed storage areas, flush lanes, and bunker feed.
- A study by Dr. Schmidt to validate the effectiveness and capture efficiency of using flux chambers that were used to quantify emissions in the dairy studies.

These studies have provided many findings that provided a better understanding of the emissions at CAFs.

### **1.2.3 EMISSION FACTORS**

Accurate Emission Factors are needed in order to calculate source emissions, reductions, and cost effectiveness of control measures. However, prior to January 1, 2004 (the date the exemption was lifted from agriculture sources), the only available emission factor for dairies, swine, rabbits, horses, sheep, and goats was based on a metabolism study conducted in 1938 by Benedict and Ritzman. This study measured methane from animals including an elephant, a horse, seven Holsteins, four Jerseys, and a Hereford cow.

To address the need for better science, the District, other regulatory agencies, industry and the scientific community put forward multiple research projects to close the gap on the emissions data. This study and the subsequent research papers were the most current published and reviewed source of emission factors for several species during the Rule development process. Although multiple studies were completed in time for Rule 4570 development that proved useful, a significant amount of additional questions were raised and even more data gaps still remain. Several most recent articles have reported different emissions from these operations and emission sources. However, those emission factors tend to be inconsistent, possibly due to variation between facilities, and are not complete and have yet to be vetted by District Staff. As a note, the District is reevaluating the emissions from dairy and cattle operations taking into account all the latest studies completed. This effort will be taking place over the next several months.

### **1.2.4 EMISSION INVENTORY**

Staff utilized the 2002 USDA census, industry data, and California Air Resources Board documents to estimate the VOC's emitted by CAFs in the SJVAB. The methodology is further explained below; Table 1 summarizes the results.

	<b>VOC Emission Factor (lb/hd/yr)</b>	<b>Total VOC Emitted by CAFs (tons/day)</b>	<b>Total VOC Emitted by Large CAFs (tons/day)</b>
Milk Cows	21.00	51.28	36.92
Beef Cattle	11.90	2.80	2.66
Other Cattle	8.30	15.56	14.79
Poultry	7.20	3.54	2.16
Swine		1.00	0.57
Other Animals	6.60	0.00	0.00
<b>Total Animals</b>		<b>74.57</b>	<b>57.09</b>

#### 1.2.4.1 Dairy

Staff utilized the California Department of Food and Ag (CDFA) report entitled "California Agricultural Statistics 2004." The numbers are shown in Table 2. These numbers only include milking and dry cows, not heifers that have not calved or calves.

<b>County</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>Projected 2005*</b>
Fresno	86,115	90,345	95,577	99,878
Kern	85,830	98,478	121,147	126,599
Kings	146,545	153,475	162,656	169,976
Madera	49,899	57,099	63,934	66,811
Merced	224,895	224,734	237,854	248,557
San Joaquin	99,828	106,162	103,619	108,282
Stanislaus	164,558	177,432	178,420	186,449
Tulare	424,643	437,476	442,853	462,781
<b>Total</b>	<b>1,282,313</b>	<b>1,345,201</b>	<b>1,406,060</b>	<b>1,469,333</b>

\*The growth from 2002 to 2003 was approximately 4.9% and the growth from 2003 to 2004 was 4.5%. In order to be conservative, staff assumed a growth of 4.5% for 2004 to 2005.

In order to estimate the number of support stock at a dairy, ratios were developed using 216 dairy applications submitted to the District. Based on those applications the following ratios, listed in Table 3, were developed. These ratios represent the number of each type of animal.

<b>Support Animals to Milkers</b>	<b>Dry Cows to Milkers</b>	<b>Heifers (15-24 mo) to Milkers</b>	<b>Heifers (7-14 mo) to Milkers</b>	<b>Heifers (4-6 mo) to Milkers</b>	<b>Calf (&lt;4 mo) to Milkers</b>
107%	16%	34%	29%	16%	11%

Before the above ratios can be applied to the CDFA milk and dry cow numbers to estimate a total number of head, the number of dry cows needs to be subtracted from the milk and dry cow numbers. Based on the ratios above, 16% of cows are dry cows when compared to milk cows, therefore the calculations would be as shown in the example below:

$$1,469,333/1.16 = 1,266,666 \text{ milk cows}$$

$$1,266,666 \times 0.16 = 202,667 \text{ dry cows}$$

$$1,266,666 \times 0.11 = 139,333 \text{ calves}$$

Now we can use the ratios in Table 7 to estimate all the other types of cows at a dairy.

Staff assumed, based on the ARB's June 23, 2005 Staff Report for Confined Animal Facilities page iii, that 72% of the dairy cows would be included in this regulation.

Furthermore, since the APCO Report noted that the 19.3 lb/hd-yr factor did not consider all emission sources and that the majority of facilities have freestalls, in order to be conservative, Staff utilized the weighted emission factor of 21.0 lb/hd-yr listed on the District's web page for dairies.

	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
Milk Cows	1,266,666	21.00	26,599,994	912,000	21.00	19,151,996
Dry Cows	202,667	11.90	2,411,733	145,920	11.90	1,736,448
Heifers (15-24)	430,667	8.30	3,574,533	310,080	8.30	2,573,663
Heifers (7-14)	367,333	7.20	2,644,799	264,480	7.20	1,904,256
Heifers (3-6)	202,667	6.60	1,337,600	145,920	6.60	963,072
Calves	139,333	6.20	863,866	100,320	6.20	621,984
Total Cows	2,609,333		37,432,525	1,878,720		26,951,418

#### 1.2.4.2 Beef and Other Cattle

The following table includes other cattle facilities in the San Joaquin Valley, from a USDA California Agricultural Statistics 2004 Report and beef on feedlots from the California Farm Bureau Federation. Staff assumed, based on the ARB's June 23, 2005 Staff Report for Confined Animal Facilities page 8, that 95% of the beef cattle and other cattle would be included in this regulation. This is based on the assumption that a similar number of beef and other cattle would be included in this rule as feedlot cattle listed in the ARB Staff Report.

Furthermore, staff assumed that there were equal numbers of each type of heifers and calves at the other cattle facilities therefore, averaged the emission factors for heifers and calves in order to obtain the emission factor for other cattle. This was used to develop Table 9.

	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
<b>Total Beef</b>	184,050	11.10	2,042,955	174,848	11.10	1,940,807
<b>Total Other Cattle</b>	1,605,000	7.08	11,355,375	1,524,750	7.08	10,795,230
<b>Total</b>	1,789,050		13,398,330	1,699,598		12,736,037

### 1.2.4.3 Poultry and Other Animals

Staff obtained an estimate of the number of layers in the SJVAB from USDA census data. Since the ARB Proposed Emission Methodology assumed no significant growth for layers, staff assumed that the layer population has been relatively constant since 2002. Based on ARB June 23, 2005 Public Hearing to Consider the Adoption of a Regulation Establishing a Definition of BACT, staff assumed that 62% of the layers are housed in large CAFs.

Staff obtained estimates of the number of broilers and turkeys in the SJVAB from the California Poultry Federation. Based on this information, staff determined the number of turkeys and broilers housed in large CAFs.

	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
<b>Layers</b>	11,717,799	0.050	585,890	7,265,035	0.050	363,252
<b>Broilers</b>	47,608,059	0.025	1,190,201	29,540,054	0.025	738,501
<b>Turkeys</b>	8,071,297	0.100	807,130	4,728,720	0.100	472,872
<b>Total</b>	67,397,155		2,583,221	41,533,809		1,574,625

Staff obtained an estimate of the number of rabbits, goats, sheep, and swine in the SJVAB from the USDA census data. Since ARB Proposed Emission Methodology assumed no significant growth for non-cattle, staff assumed that the non-cattle population has been relatively constant since 2002. Based on the District's permit database, staff found that approximately 90,000 swine are housed in large CAFs and no rabbits, goats, or sheep in the SJVAB are housed in large CAFs. This is illustrated in Table 7.

Table 11: Total 2005 Other Animals						
	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
<b>Rabbits</b>	3,903	0.190	742	-	0.190	-
<b>Goats</b>	34,160	0.960	32,794	-	0.960	-
<b>Sheep</b>	273,800	0.960	262,848	-	0.960	-
<b>Swine</b>	158,536	4.600	729,266	90,000	4.600	414,000
<b>Total</b>	470,399		1,025,649	90,000		414,000

### 1.3 LACK OF AIR POLLUTION CONTROLS BEFORE RULE 4570

As discussed earlier, prior to January 1, 2004, agriculture sources were exempt from air permitting requirements in California. Therefore, prior to 2004 and in most cases prior to the passage of Rule 4570 in 2006, agriculture sources had practically no pollution control systems in place. Agriculture sources were primarily managed and operated completely at the operator's discretion without any thought to the effects of their operation to air emissions. In addition, as discussed above, prior to recent studies, the science was completely lacking which would allow for any reasonable control to be used that would effectively reduce VOC emissions.

The District's efforts to develop Rule 4570 sparked new scientific research into understanding the emissions profile and potential strategies to reduce emissions. A great deal of research has already been conducted and research is ongoing and will continue far into the future.

With the changes to the CH&SC and the resulting loss of exemption from permitting of agricultural sources of air pollution (CH&SC 39011.5 (b)), new or expanded CAFs are now required to undergo the BACT process as a requirement under New Source Review (NSR). District Rule 2201 (New and Modified Stationary Source Review Rule) implements state and federal requirements under Title I, Part D and requires BACT for new sources or sources undergoing modification with emission increases that are above the de minimis value (two (2) pounds per day of VOC). BACT provisions would apply to sources which are subject to District permitting requirements and that emit or may emit one or more affected pollutant, either as a "major" source subject to Title V permitting or as a source with actual emissions which are 50% or more of any major source thresholds.

## 2 OVERVIEW OF RULE 4570

### 2.1 REASONS FOR IMPLEMENTATION

#### 2.1.1 FEDERAL AND STATE PLANNING REQUIREMENTS

In mid-2003, the San Joaquin Valley Air Pollution Control District started the process of revising its attainment plan to meet the federal one-hour ozone standard. The July 2003 workshops for the *Extreme Ozone Attainment Demonstration Plan* included a control measure for confined animal feeding operations. The Plan was adopted in October 2004 and established a CAF rule adoption deadline of 2<sup>nd</sup> Quarter 2006, and set a 2010 VOC emission reduction goal of 15.8 tons per day based on a 61.3 ton per day emission baseline.

Since Rule 4570 was a control measure in the District's 2004 1-Hour Ozone Plan, it is subject to Federal Register, Clean Air Act (CAA), and California Health and Safety Code (CH&SC) requirements. Additionally, despite the federal revocation of the federal 1-hour ozone standard, anti-backsliding provisions commit the District to develop all control measures listed in the 2004 1-Hour Ozone Plan (Federal Register Volumes 69 and 70). These federal and state planning requirements are summarized in the following table.

<b>Federal and State Planning Requirements and District 2004 1-Hour Ozone Plan Commitments</b>		
<b>Subject</b>	<b>Reference</b>	<b>Requirement</b>
RACT	CAA 182(b)(2) and 182(f)	Ozone attainment plans shall assure that reasonable available control technology (RACT) for volatile organic compounds (VOC) is in use at sources and on source categories at or above the RACT threshold.
RACT Threshold	70 Federal Register 30592-30596	The applicable RACT threshold for control measures shall be the threshold in effect on June 15, 2004. The District's threshold on June 15, 2004 was 10 tons per year (tpy) for VOC. Therefore, 10 tpy was the RACT threshold for Rule 4570.
Timeline	CAA Section 172(c)(1)	Ozone attainment plans shall implement control measures as expeditiously as practicable, and provide for attainment.
Anti- backsliding	69 Federal Register 23955	Districts shall develop all control measures listed in the one-hour Ozone Plan until the District is

Federal and State Planning Requirements and District 2004 1-Hour Ozone Plan Commitments		
Subject	Reference	Requirement
		designated as attainment for the 8-hr NAAQS.
BARCT	CH&SC 40919(a)(3) Ozone Plan	Ozone attainment plans should provide for best available retrofit technology (BARCT) for existing permitted sources.
Feasible Controls	CH&SC 40914(a)(2)	Ozone attainment plans should include "all feasible control measures."
Deadlines	Ozone Plan	Rule adoption by the 2nd quarter of 2006.
Reductions	Ozone Plan	The rule shall reduce VOC emissions by at least 25% from the baseline by 2010. Twenty-five percent of the baseline used for the Ozone Plan (63.1 tpd) is 15.8 tpd.

In addition, the California Health and Safety Code (CH&SC) Section 40914(a)(2) states that ozone attainment plans should include *All Feasible Control Measures* (AFCMs). The ARB interprets "every feasible control measure to mean that, at a minimum, a district considers regulations that have been successfully implemented elsewhere. They should also consider going beyond what has already been accomplished by evaluation of new technologies and innovative approaches that may offer potential emission reductions. Further, districts should consider not only technological factors, but also social, environmental, economic (e.g., cost effectiveness), and energy factors which prevail in the District, along with the resources realistically available to the district to adopt, implement, and enforce the measures."

In the context of rule development, District staff considers AFCM to mean that each rulemaking project seeks to obtain as much emission reduction from the rule's source category as is expeditiously practicable, technologically feasible and economically reasonable, as determined by the District's Governing Board. To this end, District staff compares the current emission limits or control technology against what limits or control technology has been promulgated in other districts, as well as reviewing the federal, state, and local BACT clearinghouses for the most recent control technology available for the source category. The information obtained through this research is used to craft the proposed emission limits or imposed control technology.

### 2.1.2 STATE LAW – SB 700

On September 22, 2003, Governor Gray Davis signed into law Senate Bill 700. The bill amended air pollution control requirements in the California Health and Safety Code to include requirements for agricultural sources of air pollution. Agricultural sources of air

pollution were the focus of the bill for two main reasons. First, California law had previously exempted these sources from requirements to obtain air permits. This resulted in a conflict between state and federal law, and California faced sanctions if it failed to correct the problem. Had the bill not been signed, new and expanding businesses in the state would have faced significant and costly hurdles to obtain air permits required under federal law, and the state would have lost billions of dollars in federal transportation funding.

The bill did six main things: (1) It defines "agricultural source" in state law; (2) It removes the restriction from state law that prevented air districts from requiring permits for agricultural sources; (3) It establishes specific permitting and exemption requirements for agricultural sources; (4) It requires emission control regulations in areas that do not attain National Ambient Air Quality Standards for PM10; (5) It requires permits and emissions mitigation for Confined Animal Facilities (CAFs) that are defined by ARB as "large" (based on a review of current scientific data about emissions from CAFs and the impact of those emissions on attainment of ambient air standards); and (6) It requires CAPCOA to compile a clearinghouse of information about available emissions control and mitigation for agricultural activities. It is important to note that the bill did not remove the exemption for agricultural operations from the general odor- nuisance provisions of the Health and Safety Code.<sup>7</sup>

In addition to satisfying District Planning commitments, Rule 4570 was also designed to fulfill the following requirements created by SB 700.

<b>SB700/California Health and Safety Code Requirements</b>		
<b>Subject</b>	<b>CH&amp;SC Sections</b>	<b>SB700 / CH&amp;SC Requirements</b>
Large Confined Animal Facility Definition (large CAF)	40724.6(a)	The District shall use the "large CAF" definition developed by the California Air Resources Board (ARB).
Deadline	40724.6(b)	By July 1, 2006 the District shall adopt, implement, and submit for inclusion in the state implementation plan a rule requiring owners of "large" CAF to obtain a permit.
Degree of Mitigation Required	40724.6(d)(1)(B)	Best Available Retrofit Control Technology (BARCT) is the degree of mitigation required of large CAF.
Compliance Schedule	40724.6(d)(4)	Owner/operators shall implement control measures within one year of the permit issuance date.
Permit Requirements to be Included	40724.6(d)	1. The permit shall include an emission mitigation plan that demonstrates use of BARCT,

<sup>7</sup> CAPCOA White Paper on SB700



<b>SB700/California Health and Safety Code Requirements</b>		
<b>Subject</b>	<b>CH&amp;SC Sections</b>	<b>SB700 / CH&amp;SC Requirements</b>
in the Rule		<ol style="list-style-type: none"> <li>2. The District shall provide for a 30-day public noticing and commenting period for proposed permits, (The District shall review and update permits at least once every three (3) years,</li> <li>3. The District shall act on completed permit applications within six (6) months of receipt,</li> <li>4. The permit shall include sufficient information to prepare an emission inventory of all regulated air pollutants emitted from the facility, and</li> <li>5. The owner/operators of large CAF shall submit a permit application within six (6) months of Rule 4570 adoption.</li> </ol>
Impact Assessment	40724.6(d)	<p>Prior to adopting a rule, the District shall analyze the following:</p> <ol style="list-style-type: none"> <li>1. Category, number, and size of facilities affected,</li> <li>2. Nature, quantity, and significance of emissions in adversely affecting public health, the environment, and attainment of air quality standards,</li> <li>3. Emission reduction potential,</li> <li>4. Costs,</li> <li>5. Impact on employment and the economy,</li> <li>6. Alternative controls, and</li> <li>7. Technical and Practical Feasibility.</li> </ol>

### 2.1.2.1 RULE DEVELOPMENT PROCESS

As part of the rule development process, District staff conducted public scoping meetings in April 2005, public workshops and Socioeconomic Focus Group meeting in March 2006 in order to present, discuss, and solicit comments on Rule 4570. In addition to the workshops, staff met with representatives of the impacted industries, and control technology vendors to receive comments on the technical aspects and compliance costs of the proposed rule. The comments received from the public, affected sources, California Air Resources Board, and United States Environmental Protection Agency during the public workshop process and technical consultation meetings were incorporated into the rule as appropriate. Comments received and District responses are discussed in Appendix A of the Final Draft Staff Report.

Rule 4570 and the Final Draft Staff Report including the analyses mandated by CH&SC were published prior to a public hearing on June 15, 2006 for the District Governing Board to consider the adoption of the rule. The notice of the public hearing for this rule project was published in a general circulation newspaper in each of the eight San Joaquin Valley counties, and was mailed to affected sources and interested parties. The public notice solicited written comments to be submitted by mail, and identified the name and telephone numbers of the District staff that could answer questions and respond to comments. The June 15, 2006 adoption schedule satisfied the requirement of the CH&SC for the District to adopt a regulation by July 1, 2006.

### **2.1.2.2 Main Issues Addressed in the Rulemaking Process**

#### **2.1.2.2.1 Difficulty of Controlling Fugitive Emissions**

Because of the large amount of land required to sustain the growth of crops and raising of animals, agricultural facilities, by their nature, tend to be very expansive. Agricultural production areas can span over a hundred acres with air contaminants primarily produced as fugitive emissions from multiple sources and operations at the facility. Fugitive emissions are defined as *“those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening.”* Examples of fugitive emission sources at agricultural facilities include enteric emissions from livestock and emissions from animal waste that is applied to land.

As discussed in above, it was demonstrated that the majority of emissions from confined animal operations are fugitive. The fugitive nature of the emissions from agricultural sources and their expansive size impose challenges and limitations to the type of controls that can be feasibly applied to reduce emissions. Unlike other stationary sources, where the majority of emissions are collected and released through a chimney, pipe, vent, or stack, which facilitates the use of traditional emission controls (e.g. fabric filters, catalysts, scrubbers, etc.), emissions from agricultural sources are spread out over large areas and are very dilute at the point of release. These emissions cannot reasonably be captured since capture of these emissions would entail monumental changes, which have not yet been developed and are likely infeasible, to the methods that are currently used for agricultural production. An additional consideration is that, unlike traditional stationary sources, potential adverse affects to livestock must also be considered when changes in production methods are undertaken, such as those needed to capture emissions.

As mentioned, it would be exceedingly difficult to design and construct a system capable of capturing the majority of emissions from these sources without even considering control of these emissions; however, even if it were possible to capture most of the fugitive emissions, the extremely dilute nature of the emissions emitted from animals at agricultural sources would still cause the use of traditional point source controls to be infeasible and exceedingly expensive. Because of these constraints, the District has adopted an approach in which the best management practices are utilized to minimize emissions from confined animal facilities prior to their release.

### 2.1.2.2.2 Considerations for Animal Health and Food Safety

Emission control mitigation measures, especially those that will be applied to animals, must take into consideration the health, welfare and productivity of the animals, food safety, and bio-security issues. Animal deaths, expenses for treatment or disposal of dead animals, as well as loss of productivity due to poor animal health can all be devastating to a farmer. Government agencies such as the USDA are also deeply concerned about animal health and the related food safety and bio-security issues that affect not just individual farmers but also the entire farm industry and the public. Diseases such as foot and mouth disease, mad cow disease, or avian flu are all of grave concern to the government because of their ability to destroy the entire farm industry and/or cause enormous loss of human life. In addition, animal welfare is a significant public issue, as demonstrated by the recent passage of Proposition 2<sup>8</sup> by voters in California. While in the past, product boycotts and bad publicity were the main threats linked to animal welfare issues, the passage of laws such as Proposition 2 brings the additional possibility of litigation that can put farmers out of business.

It is therefore critical for farmers to have the flexibility to decide the kind of mitigation measures that will work best for their specific operation by taking into consideration animal health and welfare, productivity, food safety and overall bio-security issues, while at the same time achieving the required level of emission control. For instance, some dairy farmers have pointed out that high moisture levels in animal pens increase cases of mastitis infections in their herds. In such cases, it would be unfair to compel farmers to implement mitigation measures that increase moisture levels in their animal pens because of the potential harm to animal health, cost of treatment and loss of productivity. Instead, an option to implement another mitigation measure that achieves the same level of emission control should be provided. On the other hand, if certain mitigation measures such as housing dairy cows in completely enclosed barns were to be required across the board, many farmers, depending on case-by-case factors such as size of operation, location or financial resources, may find themselves exposed to serious animal welfare issues and devastating litigation.

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<sup>8</sup> Proposition 2 was a [California ballot proposition](#) in that state's general election on [November 4, 2008](#), known as the Standards for Confining Farm Animals initiative. The official title of the [statute](#) enacted by the proposition is the Prevention of Farm Animal Cruelty Act. The proposition adds a chapter to Division 20 of the [California Health and Safety Code](#) to prohibit the confinement of certain farm animals in a manner that does not allow them to turn around freely, lie down, stand up, and fully extend their limbs. The measure deals with three types of confinement: [veal crates](#), [battery cages](#), and sow [gestation crates](#).

### 2.1.2.2.3 Considerations for the Wide Variety of CAFs

Due to the different methods of confinement and associated manure management, for any animal type there is no single design that encompasses every CAF. Consequently, a universal method to control emissions from all CAFs is not only not available, but not suitable. In fact, multiple measures are required to implement BARCT for this source category. The design and operation of each CAF varies depending on animal type, sub-regional climatic conditions, subsurface geologic structure, business practices, and preferences of the owners/operators. This is why the District structured the rule such that facilities must comply with rule requirements utilizing management practices and machinery that owners/operators already have access to. This also acknowledges that not all facilities can implement the same options due to infrastructure, conditional use permits, water board permits, soil types, production contracts, and other limitations.

### 2.1.2.3 Rule 4570 is not arbitrary nor capricious

CAFs are newly-regulated and the supporting science for air emissions from these sources is still developing. In the mitigation measure menu of District Rule 4570, District staff considered all of the operations within each type of CAF, the available information about emission reduction potential, as well as the feasibility and cost of implementing required mitigation measures. CAF operators control emissions in every phase of the CAF operation. Many of the assumptions were based on studies and data showing that these practices would result in some reduction, but there was insufficient science to know exactly what the reductions would be. The menu approach of Rule 4570 allows flexibility as the science of air emissions from CAFs evolves. The mitigation measures can be further focused on the operations that are shown to have the highest emissions. Independently, the mitigation measures themselves can be revised or expanded to include those that are most efficient and cost-effective each CAF emission source.

In calculating the cost effectiveness of Rule 4570, District staff determined cost effectiveness for those Class One mitigation measures that had the lowest cost. Class Two mitigation measures, although having potentially higher emission reduction potential, were not included in the cost effectiveness calculation because they are costly to implement and are considered beyond the BARCT level of control. However, the Class Two mitigation measures were included in the mitigation measure menus in order to encourage voluntary practices exceeding BARCT. It is reasonable to assume that CAF operators would opt not to use those measures so expensive that the cost far outweighs annual profits. District staff calculated the potential emission reduction of its rule based on the likelihood that only the cheapest options will be chosen. This is a prudent and reasoned approach, neither an arbitrary nor a capricious one. This opinion was echoed in a recent court decision by the California Fifth Appellate District in *Association of Irrigated Citizens vs. San Joaquin Valley Air Pollution Control District (2008)*.

## 2.2 REQUIREMENTS OF RULE 4570

### 2.2.1 APPLICABILITY

Rule 4570 controls VOC emissions from “Large Confined Animal Facilities,” as defined by the California Health & Safety Code and the Air Resources Board. According to CH&SC 39011.5(a) and 39011.5(a)(1) a CAF is defined as “a source of air pollution or a group of sources used in the...(fill in the missing text – don’t summarize) raising of fowl or animals located on contiguous property under common ownership or control...including, but not limited to, any structure, building, installation, barn, corral, coop, feed storage area, milking parlor, or system for the collection, storage, treatment, and distribution of liquid and solid manure, if domesticated animals are corralled, penned, or otherwise caused to remain in restricted areas for commercial purposes and feeding is by means other than grazing.”

The ARB was required by CH&SC 40724.6 to review all available scientific information, including, but not limited to, emission factors for confined animal facilities; the effect of those facilities on air quality in the basin; and other relevant scientific information and to develop a definition for a “large” confined animal facility. ARB’s board adopted the following thresholds for a large CAF, based on air emissions from CAFs:

<b>ARB Large CAF Thresholds</b>	
<b>Livestock Category</b>	<b>Number of Animals</b>
Dairy	1,000 lactating cows
Beef Feedlots	3,500 beef cattle
Other Cattle Operations	7,500 calves, heifers, and other cattle
Chickens-Broilers & Egg Layers	650,000 head
Turkeys	100,000 head
Swine	3,000 head
Sheep and Goats	15,000 head
Horses	2,500 head
Ducks	650,000 head
Other Livestock Not Previously Mentioned	30,000 head

Source: <http://www.arb.ca.gov/regact/lcaf05/lcaf05.htm> accessed 2/24/06

### 2.2.2 EMISSION CONTROL REQUIREMENTS

Rule 4570 requires multiple mitigation measures from all large CAFs covering the following CAFs: Dairy, Beef Feedlots, Other Cattle, Swine, Poultry, and various other smaller operations. Each of these facilities consists of multiple sources of emissions within the facility. Since these facilities generally cover a large area and have different processes, a single mitigation measure or technology is generally not sufficient in reducing overall emissions from the facility. Rather than allow facilities to select a number of measures at the emission source of their choosing, Rule 4570 specifically requires a certain number of mitigation measures at the majority, if not all, of the emission sources. Mitigation measures required by Rule 4570 have been tailored for

each source of emission, thereby ensuring that the overall emissions from a facility are reduced rather than from only a part of the facility, which would be the case if that was left as an option in the Rule. The current methodology in Rule 4570 provides for the greatest overall control from the facility.

Rule 4570 recognized the following five sources for all of the CAFs: Feed, Housing, Solid Waste, Liquid Waste and Land Application of Manure. Rule 4570 requires each CAF to implement a certain number of mitigation measures (ranging from 1 to 8 measures) for each of these sources. Rule 4570 also distinguishes between the different types of housing configurations (freestall vs open corrals) for the cattle and the different types of feed (feed stuff vs silage) and as such requires additional mitigation measures for each type. In addition, dairies are also required to implement a mitigation measure for the milking parlor. By requiring mitigation measure(s) for each source of emissions at a facility, Rule 4570 ensures that reductions are achieved throughout the entire facility.

Rule 4570 requires operators of a CAF to implement multiple VOC mitigation measures for the major emission sources at each facility. The sources covered by the Rule and the number of measures required are shown in the following table. This menu approach not only provides flexibility to facilities to select measures that are suitable to their particular operation, but the requirement to implement multiple mitigation measures in each source category results in a larger emission reduction.

<b>Summary of the Minimum Number of VOC Mitigation Measures Per Animal Type and Area Compared to Total Number of Options</b>					
Area	Dairy	Beef	Other Cattle	Swine	Poultry
Feed	4 of 8	5 of 8	5 of 8	5 of 12	5 of 10
Silage	1 of 6	1 of 6	1 of 6	0 of 0	0 of 0
Milk Parlor	1 of 3	0 of 0	0 of 0	0 of 0	0 of 0
Housing	8 of 26	7 of 15	7 of 23	5 of 10	4 of 17
Solid Manure	2 of 8	1 of 8	1 of 8	1 of 8	1 of 8
Liquid Manure	1 of 11	1 of 11	1 of 11	1 of 11	1 of 11
Land Application	2 of 7	2 of 7	2 of 7	2 of 7	0 of 0
TOTAL	19 of 69	17 of 55	17 of 63	14 of 48	11 of 46

### 2.3 ECONOMIC COSTS OF RULE 4570

The socioeconomic analysis within the District's Staff Report indicated that, although there are approximately 247 large CAFs subject to Rule 4570 that would need to implement additional mitigation measures to comply with rule requirements. The table below summarizes the number and type of CAFs that would need to implement additional mitigation measures to comply with the rule and its estimated annual compliance costs.

<b>Summary of Estimated Total Annual Compliance Cost</b>		
<b>Type of CAF</b>	<b>Number of CAFs</b>	<b>Estimated Total Annual Compliance Costs</b>
Dairy	233	\$18,324,074
Beef Feedlots	6	\$590,112
Other Cattle Facilities	5	\$7,147,266
Swine	3	\$540
<b>TOTAL</b>	<b>247</b>	<b>\$26,061,922</b>

Source: District and stakeholder comments

The socioeconomic impact analysis also showed that the total annual compliance costs represented 9.6 percent of the net profits of large dairies, 13.0 percent of the net profits of large cattle operators (beef feedlots), 13.5 percent of the net profits of other large CAF cattle stakeholders, and <1 percent of the net profits for large CAF swine stakeholders;. Annual compliance costs associated with the District's costs for impacted "other cattle industries" exceed the threshold of significance, resulting in direct employment impacts of approximately 17 jobs. Factoring in indirect impacts associated with the direct loss of 17 jobs, the rule could result in the loss of an additional 23 jobs across different industries, for a total job impact of 40 jobs.

By far, the largest cost involved with Rule 4570 will be borne by dairy operators. This section of the report discusses the methodology employed in calculating costs borne by affected dairy farms. The same methodology was used for beef feedlots, other cattle facilities, and swine facilities.

It is important to note that agriculture in general, and livestock products in particular, are "price takers", meaning that they have little ability to set price of their goods, and little ability to pass on costs to the consumer. As prices of basic goods like beef increase, consumers may switch to other products, such as poultry. Alternatively, consumers might continue to buy beef, but they may switch to products from other regions or states that could be less expensive.

### **2.3.1 EXAMPLES OF DESIGN/OPERATIONAL INCOMPATIBILITY WITH CONTROLS**

As discussed above, due to the different methods of confinement and associated manure management, there is no typical CAF. The design and operation of a CAF varies depending on animal type, regional climatic conditions, business practices, and preferences of the owners/operators. Not all of the mitigation measures included as an option in Rule 4570 can be reasonably adopted by all facilities due to infrastructure, conditional use permits, water board permits, soil types, production contracts, and other limitations. This is why the District structured the rule such that facilities comply with rule requirements utilizing management practices and machinery that owners/operators already have reasonably available to them. Examples of some of the mitigation measures that may not be adaptable to all facilities due to facility limitations are discussed below:

Mitigation Measure: *“Collect leachate from the silage piles and send it to a waste treatment system such as a lagoon at least once every 24 hours”*

Many existing facilities were not initially designed to handle or collect the leachate from the silage piles. Although Rule 4570 is a retrofit rule, for many of facilities it is not reasonable to retrofit their entire facility to accommodate this mitigation measure. Obstacles in achieving this mitigation measure are listed below:

1. The Lagoon placement is on the opposite side of the silage piles, making it almost impossible to transfer the small amount of leachate to the lagoon system
2. Grading and transfer system are non-existent and would require a significant amount of construction and demolition
3. This mitigation measure generally works well with a concrete pad and would require a large pad generally an acre in size to be poured

Therefore, Rule 4570 consists of multiple mitigation measures and operators are required to choose measures that are appropriate for their method of operation, to ensure emission reductions.

Mitigation Measure: *“Use a dry animal waste handling system, such as scraping, instead of a liquid animal waste handling system, such as a flush system”*

A significant portion of dairies in the Valley are designed around a flush system and a considerable amount of cost goes into building such a dairy. There are also several air benefits in having a flush system as long as mitigation measures are implemented. Therefore, a dairy that has invested a significant amount of capital and has elected to operate their dairy as a liquid manure management will not be able to change the make-up of their entire dairy by convert it over to a scrape system. As stated earlier, Rule 4570 was specifically structured so that facilities would comply with the rule regardless of the type of facility or manure management system.

There are specific measures available for facilities that have a liquid manure management system, just as there are measures for scrape systems. However since the flush dairies generate waste at the lagoons, a mitigation measure is also required under the liquid manure mitigation category to ensure that the emissions associated from that system are also mitigated.

Mitigation Measure: *“Use non-animal waste-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds)”*

This measure requires that a non-animal waste bedding material be used in lieu of manure or separated solids. However, not every dairy in the Valley has access to non-



manure based material due to the limited resource of these materials (almond hulls, etc).

Sand on the other hand has many disadvantages such as clogging of main drains and pipes including breakdowns from the considerable amount of wear and tear on pumps and equipment. If the infrastructure does not exist to handle this material it is unreasonable to implement this mitigation measure; which is why Rule 4570 consists of multiple mitigation measures to allow operators the flexibility to choose measures that are appropriate for their method of operation, while still ensuring emission reductions.

Mitigation Measure: *“Use lime or a similar absorbent material in the pens according to the manufacturer’s recommendations to minimize moisture in the pens.”*

Lime is extremely costly and in many cases not feasible due to soil quality and water quality issues. Therefore, while this mitigation measure may work for one facility it may not work for another.

Mitigation Measure: *“Manage the facility such that there are no lagoons at the facility.”*

Considering the uniqueness from one facility to another, Section 5.13 of Rule 4570 also allows CAF facilities to submit an emission mitigation plan demonstrating facility wide reductions of at least 30% in lieu of selecting the required mitigation measures.

### 3 REVIEW OF FEDERAL RACT REQUIREMENTS

#### 3.1 FEDERAL APPLICABILITY OF RACT

The Clean Air Act (CAA) Section 182(b)(2) states that ozone attainment plans shall assure that ract for volatile organic compounds (VOC) is applied at certain sources.

“The State shall submit a revision to the applicable implementation plan to include provisions to require the implementation of reasonably available control technology under section 172(c)(1) of this title with respect to each of the following:

(A) Each category of VOC sources in the area covered by a CTG document issued by the Administrator between November 15, 1990, and the date of attainment.

(B) All VOC sources in the area covered by any CTG issued before November 15, 1990.

(C) All other major stationary sources of VOCs that are located in the area.”

Because EPA has not issued a CTG for Confined Animal Facilities, the only applicable provision above for the San Joaquin Valley, is the need for RACT to be applied to “major stationary sources.” Because the San Joaquin Valley Air Basin is classified as an extreme ozone area, “major sources” are those that generate more than 10 tons per year of NO<sub>x</sub> or VOC.

#### 3.2 DEFINITION AND STRINGENCY OF RACT

Although the Clean Air Act itself does not define Reasonably Available Control Technology, 40 CFR 51.100(o) defines RACT as:

”devices, systems, process modifications, or other apparatus or techniques that are reasonably available, taking into account (1) the necessity of imposing such controls in order to attain and maintain a national ambient air quality standard; (2) the social, environmental, and economic impact of such controls; and (3) alternative means of providing for attainment and maintenance of such a standard.”

The foregoing definition applies to a specific federal provision regarding approval of extension requests for attainment plans for secondary air quality standards, but in the absence of a more definitive regulatory description, it is concise and useful. EPA also defined RACT in the Strelow memorandum<sup>9</sup> as:

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<sup>9</sup> The Strelow RACT Memorandum, published in BNA Environmental Reporter, December 9, 1976, pages 1210-1212

“the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available, considering technological and economic feasibility”.

### 3.3 PURPOSE OF FEDERAL RACT

The Clean Air Act requires RACT for certain sources in all nonattainment areas nationwide, regardless of the severity of the ozone problem.

“172(c) Nonattainment plan provisions

The plan provisions (including plan items) required to be submitted under this part shall comply with each of the following:

(1) In general

Such plan provisions shall provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards.”

From this section, it is clear that RACT is intended as the minimum level of control that all ozone nonattainment areas must achieve for existing sources. It is also clear that RACT not intended as the only level of control needed for all nonattainment areas to attain the ozone standard. Two key conclusions are drawn from the section above: first, states must adopt RACT for existing sources regardless if they are needed for attainment, and second, states may need additional measures beyond RACT to attain the standard. This second conclusion leads to the understanding that RACT is not intended to be the most stringent level of control in an area’s attainment strategy.

In the greater context of air pollution control levels, RACT is understood as the “floor-level” of air pollution controls, not the “ceiling-level.” More effective levels of emissions control are termed Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER). BACT and LAER are required for new sources, and for existing sources undergoing modification. Under state and federal air pollution programs, new facilities face more stringent pollution control requirements than existing facilities, with the understanding that better controls can be more easily implemented before a facility is built, than after it is built. New sources must generally implement BACT<sup>10</sup> and

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<sup>10</sup> Federal regulations for permitting new facilities require Best Available Control Technology (BACT) for new sources in attainment areas, and Lowest Achievable Emission Rate (LAER) – a generally more stringent level –for new sources in nonattainment areas. LAER differs from BACT in that economic costs are **not** considered for candidate LAER controls that are considered “Achieved in Practice.” Under California state law, the District is required to apply “BACT” for new sources under essentially the same requirements as federal LAER. The District’s “BACT” determinations thus fulfill the federal LAER requirements.

existing sources must implement a less stringent level of control such as Reasonably Available Control Technology (RACT). Additionally, California law establishes an intermediate level of control that is the “best available” for “retrofit” to existing sources (entitled Best Available Retrofit Control Technology – BARCT<sup>11</sup>), recognizing that the state’s worst ozone problems demands more effective pollution control than what is usually considered “reasonably available.”

As discussed above, the purposes of BACT, RACT, and BARCT are different. BACT is designed to minimize the growth in future stationary source emissions with the installation of best available controls; RACT is designed to reduce current stationary source emissions from existing sources with the application of reasonably available controls; and BARCT is designed to reduce current stationary source emissions even further with the application of best available retrofit controls. BACT is identified and prescribed in the permitting process on a case-by-case administrative basis. RACT and BARCT are developed on an industry-wide basis in the rule development process, which concludes with quasi-legislative action by the District Governing Board.

### **3.4 RACT GUIDANCE FROM EPA REGION IX**

A letter from EPA, Region IX<sup>12</sup> outlined documents that could be useful in establishing RACT. Those documents include EPA’s Control Techniques Guidelines (CTGs), Alternative Control Techniques (ACTs), New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAPs), EPA Best Available Control Technology (BACT) Clearinghouse, California Suggested Control Measures (SCM) and RACT/Best Available Retrofit Control Technology (BARCT) determinations, regulations adopted in other Districts, and guidance and rules developed by other state and local agencies.

To date, EPA has not developed any federal regulations (NSPS, MACT, NESHAP) or guidance (CTG, ACT) specific to CAFs. Best Available Control Technologies and regulations adopted in other districts are discussed below.

### **3.5 ISSUES REGARDING FEDERAL EXPECTATIONS FOR RACT**

RACT is a “moving target.” Technology considered RACT at the time of SIP-approval has always been made obsolete by more effective technology at a later date. This view of moving-target RACT requirements precludes using only comparing CTGs/ACTs or simply relying on EPA SIP-approval of rules as satisfying RACT requirements; therefore, other requirements must be considered.

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<sup>11</sup> California Health and Safety Code (CH&SC) 40406: ... "best available retrofit control 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.

<sup>12</sup> United States Environmental Protection Agency – letter from Andrew Steckel, EPA Region IX to Kurt Karperos, ARB dated March 9, 2006 – RACT SIP

It should also be noted that since District rules usually fulfill BARCT requirements for state purposes, and the control technology established by a BARCT rule is the most effective retrofit control for the existing emission category; it can be assumed to, at a minimum, satisfy RACT requirements, if not go beyond RACT.

## 4 DEMONSTRATION THAT RULE 4570 SATISFIES RACT REQUIREMENTS

This section of the Document shows how Rule 4570 satisfies federal RACT requirements. It focuses on the three broad elements that EPA generally reviews when evaluating a district rule for inclusion in the State implementation Plan (SIP): applicability, stringency, and enforceability. When EPA approves a rule for inclusion into the SIP, EPA must evaluate, at a minimum, if the rule fulfills RACT requirements. Rule 4570 was submitted to EPA for SIP approval on October 5, 2006, but has not yet been acted on by EPA.

### 4.1 APPLICABILITY OF RULE 4570 COVERS ALL CAFS THAT ARE MAJOR SOURCES AND MANY SMALLER FACILITIES

Pursuant to Section 3.25 of District Rule 2201 (New and Modified Stationary Source Review Rule), a major source is a stationary source with post-project emissions or a Post Project Stationary Source Potential to Emit, equal to or exceeding one or more of the specified threshold values. In determining whether a facility is a major source, fugitive emissions are not counted unless the facility belongs to certain specified source categories. 40 CFR 71.2 (Definitions, Major Source (2)) states the following:

*(2) A major stationary source of air pollutants or any group of stationary sources as defined in section 302 of the Act, that directly emits, or has the potential to emit, 100 tpy or more of any air pollutant (including any major source of fugitive emissions of any such pollutant, as determined by rule by the Administrator). The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of section 302(j) of the Act, unless the source belongs to one of the following categories of stationary source: (i) Coal cleaning plants (with thermal dryers); (ii) Kraft pulp mills; (iii) Portland cement plants; (iv) Primary zinc smelters; (v) Iron and steel mills; (vi) Primary aluminum ore reduction plants; (vii) Primary copper smelters; (viii) Municipal incinerators capable of charging more than 250 tons of refuse per day; (ix) Hydrofluoric, sulfuric, or nitric acid plants; (x) Petroleum refineries; (xi) Lime plants; (xii) Phosphate rock processing plants; (xiii) Coke oven batteries; (xiv) Sulfur recovery plants; (xv) Carbon black plants (furnace process); (xvi) Primary lead smelters; (xvii) Fuel conversion plants; (xviii) Sintering plants; (xix) Secondary metal production plants; (xx) Chemical process plants; (xxi) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input; (xxii) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels; (xxiii) Taconite ore processing plants; (xxiv) Glass fiber processing plants; (xxv) Charcoal production plants; (xxvi) Fossil-fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input; or (xxvii) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.*

Because agricultural operations do not fall under any of the specific source categories listed above, fugitive emissions are not counted when determining if an agricultural

operation is a major source. 40 CFR 71.2 defines fugitive emissions as “those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening.”

#### **4.1.1 Dairy**

Since emissions at a dairy are not actually collected, a determination of whether emissions could be reasonably collected must be made by the permitting authority. The California Air Pollution Control Association (CAPCOA) prepared guidance in 2005 for estimating potential to emit of Volatile Organic Compounds from dairy farms. The guidance states that “VOC emissions from the milking centers, cow housing areas, corrals, common manure storage areas, and land application of manure are not physically contained and could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening. No collection technologies currently exist for VOC emissions from these emissions units. Therefore, the VOC emissions from these sources are considered fugitive.” The guidance also concludes that, because VOC collection technologies do exist for liquid waste systems at dairies, “... the VOC emissions from waste lagoons and storage ponds are considered non-fugitive.” The District has researched this issue and concurs with the CAPCOA assessment, as discussed in more detail below.

Milking Center: The mechanical system for the milking parlors can be utilized to capture the gases emitted from the milking parlors; however in order to capture all of the gases, and to keep an appropriate negative pressure throughout the system, the holding area would also need to be entirely enclosed. No facility currently encloses the holding area since cows are continuously going in and out of the barn throughout the day. The capital required to enclose this large area would also be significant. Since the holding area is primarily kept open, the District cannot reasonably demonstrate that emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Cow Housing: Although there are smaller dairy farms that have partially enclosed freestall barns, these barns are not fully enclosed and none of the barns have been found to vent the exhaust through a collection device. The airflow requirements through dairy barns are extremely high, primarily for herd health purposes. The airflow requirements will be even higher in the San Joaquin valley, where temperatures reach in excess of 110 degrees in the hot summer. Collection and control of the exhaust including the large amounts of airflow have not yet been achieved by any facility. Due to this difficulty, the District cannot reasonably demonstrate that emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

It must also be noted that EPA has determined that emissions from open-air cattle feedlots are fugitive in nature.<sup>13</sup> In the District’s judgment, this determination for emissions from open feedlots necessitates a similar determination for the open-sided

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<sup>13</sup> Letter from William Wehrum, EPA Acting Administrator, to Terry Stokes, Chief Executive Officer – National Cattlemen’s Beef Association (November 2, 2006) (<http://www.epa.gov/Region7/programs/artd/air/nsr/nsrmemos/cowdust.pdf>)

freestalls (usually with open access to corrals or pens and free movement of cattle in and out of the covered area) typical of the San Joaquin Valley since the typical open freestall barn in the San Joaquin Valley bears a far greater resemblance to an extensive shade structure located in a large open lot than an actual enclosed building. Therefore, emissions from open freestall barns are most appropriately treated as fugitive.

Manure Storage Areas: Many dairies have been found to cover dry manure piles. Covering dry manure piles is also a mitigation measure included in District Rule 4570. However, the District was not able to find any facility, which currently captures the emissions from the storage or handling of manure piles. Although many of these piles are covered, the emissions cannot reasonably be captured. Therefore, the District cannot reasonably demonstrate that these emissions can pass through a stack, chimney, vent, or other functionally equivalent opening. In addition, emissions from manure piles have been shown to be insignificant in recent studies.

Land Application: Emissions generated from the application of manure on land cannot reasonably be captured due to the extremely large areas, in some cases thousands of acres, of cropland at dairies. Therefore, the District cannot reasonably demonstrate that these emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Feed Handling and Storage: The majority of dairies store the silage piles underneath a tarp or in an Agbag. The entire pile is covered except for the face of the pile. The face of the pile is kept open due to the continual need to extract the silage for feed purposes. The silage pile is disturbed 2-3 times per day. Because of the ongoing disturbance to these piles, it makes it extremely difficult to design a system to capture the emissions from these piles. In fact, as far as the District is aware, no system has been designed to successfully extract the gases from the face of the pile to capture them, and, as important, no study has assessed the potential impacts on silage quality of a continuous air flow across the silage pile, as would be required by such a collection system. Therefore, the District cannot demonstrate that these emissions can be reasonably expected to pass through a stack, chimney, vent, or other functionally equivalent opening.

As discussed above, the VOC emissions from the milking center, cows housing, manure storage areas, land application of manure and feed handling and storage are considered fugitive. The District has determined that control technology to capture emissions from lagoons (biogas collection systems, for instance) is in use; therefore, these emissions can be reasonably collected and are not fugitive. Therefore, only emissions from the non-fugitive sources, such as lagoons, storage ponds, IC engines, and gasoline tanks, will be used to determine if dairies are major sources.



#### 4.1.2 Poultry Houses

As discussed in section 1.1.3.4, majority of poultry operations consist of ventilated houses. Since these houses have the potential of being fully enclosed and reasonably vented to a stack, the emissions from these sources will be considered non-fugitive.

#### 4.1.3 Conclusion – Rule 4570 Applicability Covers All Major Sources

Based on the discussion above, the majority of the agricultural sources in the Valley will be considered fugitive sources of emissions. Since fugitive emissions are not considered in the determination of a major source, then the majority of facilities in the Valley will not be considered as major sources. The following table shows the number of facilities that will potentially be major sources in the Valley:

Livestock Category	Applicability of Rule 4570	# of facilities Subject to Rule 4570	Major Source Thresholds	# of major sources
Dairy	1,000 lactating cows	≈550	7,407 milk cow equivalents	22-29
Beef Feedlots	3,500 beef cattle	12	12,500 cattle only if lagoons on-site	0
Other Cattle Operations	7,500 calves, heifers, and other cattle	---	16,667 heifers & 22,222 calves	0
Chickens-Broilers & Egg Layers	650,000 head	32	400,000 broilers & 800,000 layers	31
Turkeys	100,000 head	35	200,000 turkeys	11
Swine	3,000 head	1	≈4,500	1
Sheep and Goats	15,000 head	0	---	---
Horses	2,500 head	0	---	---
Ducks	650,000 head	0	400,000 ducks	0
Other Livestock Not Previously Mentioned	30,000 head	---	---	---

Given that RACT only applies to major sources of emissions, based on the table above, only a small percentage of facilities subject to Rule 4570 are actually subject to federal RACT requirements. However, Rule 4570 requires facilities greater than the thresholds listed above to comply with the requirements of Rule 4570, which is a much larger set of facilities, and hence more stringent.

#### 4.2 THE REQUIREMENTS OF RULE 4570 ARE SUFFICIENTLY EFFECTIVE TO BE CONSIDERED RACT

Rule 4570 requires operators of a CAF to implement multiple VOC mitigation measures for the major emission sources at each facility. The sources covered by the Rule and the number of measures required are shown in the following table:

<b>Summary of the Minimum Number of VOC Mitigation Measures Per Animal Type and Area Compared to Total Number of Options</b>					
Area	Dairy	Beef	Other Cattle	Swine	Poultry
Feed	4 of 8	5 of 8	5 of 8	5 of 12	5 of 10
Silage	1 of 6	1 of 6	1 of 6	0 of 0	0 of 0
Milk Parlor	1 of 3	0 of 0	0 of 0	0 of 0	0 of 0
Housing	8 of 26	7 of 15	7 of 23	5 of 10	4 of 17
Solid Manure	2 of 8	1 of 8	1 of 8	1 of 8	1 of 8
Liquid Manure	1 of 11	1 of 11	1 of 11	1 of 11	1 of 11
Land Application	2 of 7	2 of 7	2 of 7	2 of 7	0 of 0
TOTAL	19 of 69	17 of 55	17 of 63	14 of 48	11 of 46

As discussed earlier, there is no typical CAF. This menu option not only provides flexibility to facilities to select measures that are suitable to their particular operation, but the requirement to implement multiple mitigation measures in each source category results in a larger emission reduction.

##### 4.2.1 RULE 4570 REQUIREMENTS HAVE BEEN APPROVED BY EPA AS BACT

The District has issued permits to well over 40 new and expanding dairies over the last few years. These permits were issued with Rule 4570 mitigation measures as a part of the Best Available Control Technology (BACT) requirements. The District also issued permits to a couple of new and modifying poultry operations. These permits were also issued with Rule 4570 mitigation measures as part of BACT. Since these measures have been considered to be BACT for these facilities, Rule 4570 exceeds the RACT requirements. In addition, BACT advances technology more so than the Rule process does. A copy of the poultry BACT analysis is attached as attachment xxx.

##### 4.2.2 RULE 4570 IS AS EFFECTIVE AS OTHER AIR DISTRICTS

As the largest agriculture area in the state, the District took the lead in developing the variety of mitigation measures list in District Rule 4570. This list is essentially identical for all air districts that identify mitigation measures in their rules. While other air districts have adjusted some of the original mitigation measures; District Rule 4570 list still serves as the primary source for available emission controls for large CAFs.

Of all the air districts analyzed, only Sacramento Metropolitan AQMD and the District claimed emission reductions from adopting their rules. Emission reductions affected the various types of CAFs differently, however, in the final staff report for District Rule 4570, overall emission reductions were estimated at 28% of the calculated baseline emissions. Sac Metro used similar methodology for sources in their area and claimed a 24% reduction from the total CAF baseline emissions.

The following California air district rules were compared to District Rule 4570:

- South Coast AQMD Rule 223
- Bay Area AQMD Regulation 2 Rule 10
- Ventura County APCD Rule 23
- Sacramento Metropolitan AQMD Rule 496
- Imperial County AQMD Rule 217 and Policy 38
- Butte County APCD Rule 450

It is important to note that only District Rule 4570 and Sacramento Metropolitan AQMD Rule 496 are prohibitory rules. For this reason, these rules include detailed recordkeeping as well as monitoring and testing requirements. Generally, the level of detail in a prohibitory rule is absent from permits rules because the purpose of a permit rule is different from the purpose of a prohibitory rule.

#### **4.2.2.1 South Coast AQMD Rule 223**

##### **4.2.2.1.1 Applicability/Exemption/Large CAF Definition**

South Coast AQMD adopted ARB's definition of large CAF. District Rule 4570 defines large CAF the same way except for a large horse CAF. District Rule 4570 defines a large horse CAF as 3,000 head, whereas South Coast AQMD defines it as 2,500 head.

##### **4.2.2.1.2 Requirements for Dairy Large CAFs**

#### **Feed Mitigation Measures**

District Rule 4570 has seven Class One mitigation measures for feed and three Class One mitigation measures for silage. There are three Class Two mitigation measures for silage. Operators must implement four feed mitigation measures and one silage mitigation measure for five total feed mitigation measures. In the South Coast AQMD rule, there are nine feed mitigation measures, from which the operator must implement five. In the South Coast AQMD rule, there is no requirement to control emissions from silage. In this respect, District Rule 4570 is more stringent.

Within the Class One mitigation measures, *removal of excess/spoilt feed from feed lanes/aprons*, is more stringent under the South Coast AQMD rule. The South Coast AQMD rule requires excess/spoilt feed to be removed every 7 days, whereas Rule 4570 requires this to be done every 14 days.



### **Milk Parlor Mitigation Measures**

The milk parlor mitigations measures are identical. Each rule has one Class One and one Class Two mitigation measure, from which operators are required to implement at least one.

### **Freestall Mitigation Measures**

District Rule 4570 has eight Class One and one Class Two mitigation measures, from which facilities are required to implement at least two. South Coast AQMD Rule 223 has eight Class One mitigations measures (no Class Two mitigation measures), from which facilities are required to implement at least two. The extra (Class Two) mitigation measure option offered by District Rule 4570 is *vacuuming waste instead of scraping or flushing and injecting or incorporating into land with 72 hours of removal*.

South Coast AQMD Rule 223 has three Class One mitigation measures that are more stringent than the corresponding District Rule 4570 measures: (*inspect water pipes and troughs and repair leaks; remove animal waste that is not dry from individual cow freestall beds; and rake, harrow, scrape, or grade bedding in freestalls*). The South Coast rule requires pipes and troughs to be inspected daily, and manure from freestall beds to be removed daily, whereas District Rule 4570 requires both of these measures to be carried out only once every 14 days. The South Coast rule also requires freestall beds to be raked/harrowed/graded at least twice every seven days, whereas District Rule 4570 requires this measure to be carried out only once every 14 days. Although, South Coast rule has a higher frequency for these measures, the emissions generated from these sources are not significant, including the reductions achieved from the overall dairy. In addition, the frequency required by the South Coast Rule exceeds RACT when compared to inspection leak requirements in other Rules and regulations.

### **Corral Mitigation Measures**

District Rule 4570 has 15 Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least six. South Coast AQMD Rule 223 has 14 Class One mitigation measures and two Class Two mitigation measures, from which facilities are required to choose at least six.

South Coast AQMD Rule 223 has one Class One mitigation measure (*inspect water pipes and troughs and repair leaks*) that is more stringent than the corresponding District Rule 4570 measure. The South Coast rule requires this measure to be carried out daily, whereas District Rule 4570 requires it to be carried out only once every 14 days. Although, South Coast rule has a higher frequency for this measure, the emissions generated from this source is not significant, including the reductions achieved from the overall dairy. In addition, the frequency required by the South Coast Rule exceeds RACT when compared to inspection leak requirements in other Rules and regulations.

The two rules also differ slightly in the categorization (Class One vs. Class Two) of mitigation measures relating to shade structures and corrals soil additives, but these differences are not expected to have any effect on the stringency of the mitigation measures.

### **Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 has five Class One mitigation measures and three Class Two mitigation measures, from which operators are required to choose at least two. South Coast AQMD Rule 223 has three Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least two.

South Coast AQMD Rule 223 has one Class Two mitigation measure (*send at least 51% of the animal waste removed from animal housing to a digester*) that is more stringent than the corresponding District Rule 4570 measure. The South Coast rule specifies that the animal waste must be sent to a digester within 72 hours of removal from housing, whereas District Rule 4570 does not specify a timeline within which this measure must be implemented.

Since Class Two options are not required, they do not affect the stringency of the rule. In addition, the emissions from solid manure account for a fraction of emissions from the overall dairy, thus resulting in a very small reduction in emission regardless of the practice selected.

### **Liquid Waste Mitigation Measures**

District Rule 4570 has five Class One mitigation measures and five Class Two mitigation measures, from which operators are required to choose at least one. South Coast AQMD Rule 223 has five Class One mitigation measures and five Class Two mitigation measures, from which operators are required to choose at least one. All the mitigation measures are similar in stringency.

### **Land Application of Manure Mitigation Measures**

District Rule 4570 has six Class One mitigation measures, from which facilities are required to choose at least two. South Coast AQMD Rule 223 has four Class One mitigation measures, from which facilities are required to choose at least two. All the mitigation measures are similar in stringency.

#### **4.2.2.1.3 Requirements for Poultry Large CAFs**

### **Feed Mitigation Measures**

District Rule 4570 has nine Class One mitigation measures, from which facilities are required to choose at least five. South Coast AQMD Rule 223 has nine Class One

mitigation measures, from which facilities are required to choose at least five. All the mitigation measures are similar in stringency.

### **Housing Mitigation Measures**

District Rule 4570 has twelve Class One mitigation measures and four Class Two mitigation measures, from which facilities are required to choose at least four. South Coast AQMD Rule 223 has twelve Class One mitigation measures and four Class Two mitigation measures, from which facilities are required to choose at least four. South Coast AQMD Rule 223 has four Class One mitigation measures (*remove caked manure; clean under poultry cages; adjust the height, volume, and location of drinkers; and inspect water pipes and drinkers and repair leaks*) that are more stringent than the corresponding District Rule 4570 measures. The South Coast rule requires these measures to be carried out daily, whereas District Rule 4570 requires them to be carried out only once every 14 days.

### **Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 has four Class One mitigation measures and two Class Two mitigation measures, from which facilities are required to choose at least one. South Coast AQMD Rule 223 has four Class One mitigation measures and three Class Two mitigation measures, from which operators are required to choose at least one. District Rule 4570 has one Class One mitigation measure (*send all animal waste to a lagoon*) that is more stringent than the corresponding South Coast AQMD Rule 223 measure. District Rule 4570 requires this measure to be carried out within 72 hours of manure being removed from housing, whereas South Coast AQMD Rule 223 does not specify any timeline within which the measure is to be carried out.

South Coast AQMD Rule 223 has one Class Two mitigation measure (*send at least 51% of the animal waste removed from animal housing to a digester*) that is more stringent than the corresponding District Rule 4570 measure. The South Coast rule specifies that the animal waste must be sent to a digester within 72 hours of removal from housing, whereas District Rule 4570 does not specify a timeline within which this measure must be implemented.

Since Class Two options are not required, they do not affect the stringency of the rule. In addition, the emissions from solid manure account for a fraction of emissions from the overall dairy, thus resulting in a very small reduction in emission regardless of the practice selected.

### **Liquid Waste Mitigation Measures**

District Rule 4570 has five Class One mitigation measures and five Class Two mitigation measures, from which facilities are required to choose at least one. South Coast AQMD Rule 223 has five Class One mitigation measures and five Class Two

mitigation measures, from which facilities are required to choose at least one. All mitigation measures are similar in stringency.

#### **4.2.2.1.4 Requirements for Other Large CAF Categories**

In addition to dairy and poultry CAF mitigation measures discussed above, District Rule 4570 provides specific mitigation measure option tables for beef cattle feedlots, other cattle, and swine CAFs. South Coast AQMD Rule 223 does not address mitigation measures for these additional CAF categories. For these types of large CAFs, District Rule 4570 is more stringent.

#### **4.2.2.1.5 Requirements – Suspension and Substitution of Mitigation Measures**

Both rules allow the temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. In addition, both rules allow for substitution of one mitigation measure with an equivalent or more stringent one with the submission of the appropriate application.

#### **4.2.2.1.6 Testing, Monitoring, Recordkeeping Requirements**

District Rule 4570 requires records to be maintained and retained for at least five years, whereas South Coast AQMD Rule 223 requires records to be retained for three years for non-Title V facilities and five years for Title V facilities. District Rule 4570 therefore has a more stringent record retention requirement.

District Rule 4570 requires facilities not subject to the mitigation measure requirements to maintain sufficient records to demonstrate their exemption status. Facilities subject to the mitigation measure requirements must monitor, test, and maintain sufficient records to demonstrate implementation of each mitigation measure selected. Facilities must also maintain animal population records.

South Coast AQMD Rule 223 requires the maintenance of animal population records but does not require specific records needed to demonstrate implementation of each mitigation measure selected. District Rule 4570 is therefore more stringent in the type of records required to be maintained.

#### **4.2.2.1.7 Conclusion – Comparison with South Coast AQMD Rule 223**

Under the dairy and poultry CAF categories, District Rule 4570 and South Coast AQMD Rule 223 have nearly identical mitigation measure options and requirements. There are slight differences in the frequency with which some mitigation measures are to be implemented. Specifically, there are a few measures that must be carried out weekly or daily under South Coast AQMD Rule 223 requirements, but only once every two weeks



under District Rule 4570 requirements. However, as stated earlier, many of these sources are a small portion of a dairy's overall emissions. For the larger emission sources, such as feed handling and cow housing, emission strategies for both rules are fairly equivalent, resulting in larger emission reductions. Therefore, District staff does not consider the differences between the mitigation measures from the two rules to be significant overall.

District Rule 4570 also provides mitigation for more CAF categories (beef feedlots, other cattle, and swine) that are not addressed by South Coast AQMD Rule 223, and also has much more detailed recordkeeping requirements to demonstrate implementation of selected mitigation measures. District Rule 4570 is, therefore, more stringent overall than South Coast AQMD Rule 223.

#### **4.2.2.2 South Coast AQMD Rule 1127**

##### **4.2.2.2.1 Applicability/Exemption/Large CAF Definition**

South Coast AQMD Rule 1127 applies to dairies with 50 or more cows, heifers, and/or calves. The rule applies to dairy farms and related operations such as heifer and calf farms and the manure produced on them. By comparison, District Rule 4570 applies to large CAFs regardless of animal species and covers all major processes within the CAF. For dairies, District Rule 4570 applies to those CAFs with more than 1,000 milking cows, but applies to more than manure-handling operations.

##### **4.2.2.2.2 Requirements for Dairy Large CAFs**

###### **Feed, Milking Parlor, and Freestall Mitigation Measures**

District Rule 4570 has seven Class One mitigation measures for feed and three Class One mitigation measures for silage. There are three Class Two mitigation measures for silage. Operators must implement four feed mitigation measures and one silage mitigation measure for five total feed mitigation measures. For the milking parlor, the District rule has one Class One and one Class Two mitigation measure, from which operators are required to implement at least one. District Rule 4570 has eight Class One and one Class Two freestall mitigation measures, from which facilities are required to implement at least two. South Coast AQMD Rule 1127 does not address these operations. District Rule 4570 is more stringent than South Coast AQMD Rule 1127 for these dairy operations.

###### **Corral Mitigation Measures**

South Coast AQMD Rule 1127 requires a total of four corral mitigation measures. District Rule 4570 has 15 Class One mitigation measures and three Class Two mitigation measures, from which operators are required to choose at least six. While the mitigation measures in the two rules are not phrased the same way, they cover similar requirements.

## **Solid Waste, Separated Solids, and Liquid Waste, and Land Application Mitigation Measures**

District Rule 4570 has five Class One mitigation measures and three Class Two mitigation measures for solid waste/separated solids, from which operators are required to choose at least two. For liquid waste, District Rule 4570 has five Class One mitigation measures and five Class Two mitigation measures, from which operators are required to choose at least one. District Rule 4570 has six Class One mitigation measures for land application, from which operators are required to choose at least two.

A dairy is able to comply fully with South Coast AQMD Rule 1127 by applying its manure to approved cropland, since composting and anaerobic digestion are options rather than requirements. Similarly, a dairy is able to comply fully with District Rule 4570 by applying its manure to cropland, since composting, storage in enclosed containers and anaerobic digestion are all option rather than requirements.

There is therefore no difference at all in stringency between South Coast AQMD Rule 1127 and District Rule 4570 as far as disposal of manure is concerned. In this category, District Rule 4570 is as stringent as South Coast AQMD Rule 1127.

### **4.2.2.2.3 Requirements for Other Large CAFs**

District Rule 4570 provides specific mitigation measures for beef cattle feedlots, other cattle, poultry, and swine CAFs. South Coast AQMD Rule 1127 does not address mitigation measures for these additional CAF categories. For these types of large CAFs, District Rule 4570 is more stringent.

### **4.2.2.2.4 Requirements – Suspension and Substitution of Mitigation Measures**

South Coast AQMD Rule 1127 provides one exemption per year from one of the corral clearings required every 90 days if the moisture content in the corrals is greater than 50%. The operator is required to notify the AQMD 30 days before the required cleaning, and test moisture content weekly. If moisture content is still above 50% when the cleaning is due, the operator may claim the exemption.

In comparison, District Rule 4570 allows an operator to temporarily suspend any mitigation measure as long as the suspension is recommended by a licensed veterinarian or animal nutritionist on the basis of animal health. The operator must notify the District within 48 hours prior to the suspension. If the suspension is expected to last longer than 30 days, then the operator must submit a new mitigation plan that identifies a new mitigation measure to be implemented in place of the suspended one.

District Rule 4570's exemption under this category is much more stringent because it is only a temporary suspension that cannot exceed 30 days, whereas South Coast AQMD Rule 1127's exemption is permanent, without any requirement to makeup for the

skipped mitigation. In addition, the exemption provided by Rule 1127 is very likely to be claimed much more frequently than the suspension provided by Rule 4570. This is because cattle corrals are usually waterlogged during winter rains and dairies whose corral clean-outs are due during such a period will qualify for the exemption. It is very unlikely that any of the mitigation measures required by District Rule 4570 will require suspension on animal health reasons, since most of the measures have been used in various dairies without any reported animal health issues. The District has not received any requests for suspension of any mitigation measure since the rule came into effect.

In this category of mitigation measure exemptions, therefore, District Rule 4570 is more stringent than South Coast AQMD Rule 1127.

#### **4.2.2.2.5 Testing, Monitoring, Recordkeeping Requirements**

Both South Coast AQMD Rule 1127 and District Rule 4570 require monitoring, record keeping and source testing as appropriate and sufficient to provide evidence of each mitigation measure being implemented.

In addition to record keeping, Rule 1127 requires an annual report of manure being shipped out of the dairy. No annual reporting is required by Rule 4570. Rule 1127 requires records be retained for 3 years for minor sources and 5 years for major sources, whereas Rule 4570 requires records be retained for five years for all sources.

Overall, the monitoring, testing and record keeping requirements are fairly similar for both rules.

#### **4.2.2.2.6 Conclusion – Comparison with South Coast AQMD Rule 1127**

For dairy CAFs, District Rule 4570 is more stringent than South Coast AQMD Rule 1127 in one out of four comparable categories and as stringent as South Coast AQMD Rule 1127 in an additional two out of the four comparable categories.

Although District Rule 4570 is less stringent in the exemptions category (herd size exemption), it is more stringent overall because it requires emission reductions from four additional emission categories - milk parlors, feed, freestall barns, and liquid manure - that are not addressed at all by South Coast AQMD Rule 1127 as well as requiring emission reductions from CAFs from other animal species.

#### **4.2.2.3 Bay Area AQMD Regulation 2 Rule 10 (Rule 2-10)**

Bay Area AQMD Rule 2-10 is a permit rule. As such, it has fewer specifics about large CAFs than District Rule 4570, which is a prohibitory rule.

#### **4.2.2.3.1 Applicability/Exemption/Large CAF Definition**

Bay Area AQMD adopted ARB's definition of large CAF. District Rule 4570 defines large CAF the same way except for a large horse CAF. District Rule 4570 defines a large horse CAF as 3,000 head, whereas Bay Area AQMD defines it as 2,500 head.

#### **4.2.2.3.2 Requirements for Large CAFs**

The Bay Area permit conditions must implement control measures that represent reasonably available control technology (RACT) to reduce emissions of VOC, NOx and PM from the facility. Rule 2-10 requires RACT mitigation measures rather than the more stringent BARCT controls required by District Rule 4570 as specifically noted in the Bay Area AQMD staff report for their rule. A recent phone call to Bay Area AQMD staff verified that there is no list of RACT mitigation measures in place should a large CAF apply for a permit. In this respect, District Rule 4570 is more stringent than Bay Area AQMD Rule 2-10.

#### **4.2.2.3.3 Testing, Monitoring, Recordkeeping Requirements**

District Rule 4570 requires records to be maintained and retained for at least five years, whereas Bay Area AQMD Rule 2-10 requires records to be retained for three years. District Rule 4570 therefore has a more stringent record retention requirement.

District Rule 4570 requires facilities not subject to the mitigation measure requirements to maintain sufficient records to demonstrate their exemption status. Facilities subject to the mitigation measure requirements must maintain sufficient records to demonstrate implementation of each mitigation measure selected. Facilities must also maintain animal population records. Bay Area AQMD Rule 2-10 requires the maintenance of animal population records but does not require specific records needed to demonstrate implementation of each mitigation measure selected. District Rule 4570 is therefore more stringent in the type of records required to be maintained.

#### **4.2.2.3.4 Conclusion – Comparison with Bay Area AQMD Regulation 2 Rule 10**

District staff concludes that District Rule 4570 is generally more stringent than Bay Area's Rule 2-10. This is to be expected given the difference in ozone attainment status between Bay Area AQMD and the District.

#### **4.2.2.4 Ventura County APCD Rule 23 – Exemptions from Permit**

In response to SB 700, Ventura County APCD revised its "Exemptions from Permit" rule to remove an exemption for agricultural operations, including CAFs. Ventura County APCD does not have a specific rule for CAFs. In its staff report for the rule revision, Ventura County APCD staff noted that no facilities in their jurisdiction would meet the "large CAF" definition and there was no expectation that a large CAF would move into the area in the foreseeable future; therefore, no separate CAF rule was necessary.

#### **4.2.2.4.1 Applicability/Exemption/Large CAF Definition**

Ventura County APCD adopted ARB's definition of large CAF. District Rule 4570 defines large CAF the same way except for a large horse CAF. District Rule 4570 defines a large horse CAF as 3,000 head, whereas Ventura County APCD defines it as 2,500 head. At the time of rule amendment, there are no facilities that would trigger the large CAF threshold within Ventura County.

#### **4.2.2.4.2 Requirements for Large CAFs**

There are no facilities that would trigger the large CAF threshold within the county, as stated in the Ventura County staff report for amending Rule 23. The Ventura County APCD New Source Review Rule does not list mitigation measures for large CAFs. Instead, BACT would be triggered by a new CAF that met the "large CAF" definition or BACT would be triggered if an existing CAF expanded operations enough to meet the "large CAF" definition. At that point, Ventura County APCD staff would determine BACT for the CAF.

#### **4.2.2.4.3 Conclusion – Ventura County APCD Rule 23**

Ventura County APCD does not have a specific rule for CAFs, therefore District Rule 4570 is more stringent.

#### **4.2.2.5 Sacramento Metropolitan AQMD Rule 496**

Like District Rule 4570, Sac Metro AQMD Rule 496 is a prohibitory rule, meaning that there are detailed requirements for operators.

##### **4.2.2.5.1 Applicability/Exemption/Large CAF Definition**

Sacramento Metropolitan (Sac Metro) AQMD Rule 496 adopted ARB's definition of large CAF. District Rule 4570 defines large CAF the same way except for a large horse CAF. District Rule 4570 defines a large horse CAF as 3,000 head, whereas Sac Metro AQMD defines it as 2,500 head.

##### **4.2.2.5.2 Requirements for Dairy Large CAFs**

#### **Feed Mitigation Measures**

District Rule 4570 has seven Class One mitigation measures for feed and three Class One mitigation measures for silage. There are three Class Two mitigation measures for silage. Operators must implement four feed mitigation measures and one silage mitigation measure for five total feed mitigation measures. Sac Metro AQMD has seven Class One mitigation measures for feed and three Class One mitigation measures for silage. There are three Class Two mitigation measures for silage. Operators must implement four feed mitigation measures and one silage mitigation measure for five

total feed mitigation measures. The Class One and Class Two mitigation measures are the same in both rules.

### **Milk Parlor Mitigation Measures**

The milk parlor mitigations measures are identical for Sac Metro and for the District. Each rule has one Class One and one Class Two mitigation measure, from which facilities are required to choose at least one.

### **Freestall Mitigation Measures**

District Rule 4570 has eight Class One and one Class Two mitigation measures, from which facilities are required to implement at least two. Sac Metro AQMD Rule 496 has eight Class One mitigations measures and one Class Two mitigation measure from which facilities are required to implement at least two. The Sac Metro AQMD freestall barn mitigations measures and the District Rule mitigation measures are identical.

Sac Metro AQMD Rule 496 has one Class One mitigation measures that are more stringent than the corresponding District Rule 4570 measures - *inspect water pipes and troughs and repair leaks*. The Sac Metro AQMD rule requires pipes and troughs to be inspected and repaired daily, whereas District Rule 4570 requires that this mitigation measure be carried out once every 14 days.

### **Corral Mitigation Measures**

District Rule 4570 has 15 Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least six. Sac Metro AQMD Rule 496 has 15 Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least six.

Sac Metro AQMD Rule 496 has one Class One mitigation measure (*inspect water pipes and troughs and repair leaks*) that is more stringent than the corresponding District Rule 4570 measure. The Sac Metro rule requires this measure to be carried out daily, whereas District Rule 4570 requires it to be carried out only once every 14 days.

### **Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 has five Class One mitigation measures and three Class Two mitigation measures, from which operators are required to choose at least two. Sac Metro AQMD Rule 496 has five Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least two. The Class One and Class Two mitigation measures are identical in both rules.

## Liquid Waste Mitigation Measures

District Rule 4570 has five Class One mitigation measures and five Class Two mitigation measures, from which facilities are required to choose at least one. The Sac Metro rule has four Class One mitigation measures and four Class Two mitigation measures, from which facilities are required to choose at least one. All the mitigation measures are similar in stringency.

## Land Application of Manure Mitigation Measures

District Rule 4570 has six Class One mitigation measures, from which facilities are required to choose at least two. Sac Metro AQMD Rule 496 has six Class One mitigation measures, from which facilities are required to choose at least two. All the mitigation measures are similar in stringency.

### 4.2.2.5.3 Requirements for Poultry Large CAFs

## Feed Mitigation Measures

District Rule 4570 has nine Class One mitigation measures, from which facilities are required to choose at least five. Sac Metro AQMD Rule 496 has nine Class One mitigation measures, from which facilities are required to choose at least five. All the mitigation measures are similar in stringency.

## Housing Mitigation Measures

District Rule 4570 has twelve Class One mitigation measures and four Class Two mitigation measures, from which facilities are required to choose at least four. Sac Metro AQMD Rule 496 has twelve Class One mitigation measures and four Class Two mitigation measures, from which facilities are required to choose at least four. Except as noted below, all the mitigation measures are similar in stringency.

Sac Metro AQMD Rule 496 has one Class One mitigation measure - *inspect water pipes and drinkers and repair leaks* - that is more stringent than the corresponding District Rule 4570 measure. The Sac Metro AQMD rule requires the inspection and repair to be carried out daily, whereas District Rule 4570 requires the mitigation measure to be carried out once every 14 days.

## Solid Waste and Separated Solids Mitigation Measures

District Rule 4570 has four Class One mitigation measures and two Class Two mitigation measures, from which facilities are required to choose at least one. Sac Metro AQMD Rule 496 has four Class One mitigation measures and two Class Two mitigation measures, from which operators are required to choose at least one. All the mitigation measures are similar in stringency.

## **Liquid Manure Handling**

District Rule 4570 has five Class One mitigation measures and five Class Two mitigation measures, from which facilities are required to choose at least one. Sac Metro AQMD Rule 496 has five Class One mitigation measures and five Class Two mitigation measures, from which facilities are required to choose at least one. All mitigation measures are similar in stringency.

### **4.2.2.5.4 Other Large CAFs**

In addition to dairy and poultry CAF mitigation measures discussed above, District Rule 4570 provides specific mitigation measure option tables for beef cattle feedlots, other cattle, and swine CAFs. Sac Metro AQMD Rule 496 does not address mitigation measures for these additional CAF categories. For these types of large CAFs, District Rule 4570 is more stringent.

### **4.2.2.5.5 Requirements – Suspension and Substitution of Mitigation Measures**

Both rules allow for substitution of one mitigation measure with an equivalent or more stringent one with the submission of the appropriate application. District Rule 4570 also allows the temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. The Sac Metro AQMD rule does not have a specific provision for temporary suspension of mitigation measures.

### **4.2.2.5.6 Testing, Monitoring, Recordkeeping Requirements**

The testing, monitoring, and recordkeeping provisions of District Rule 4570 and Sac Metro Rule 496 are essentially identical, therefore, are of equal stringency.

### **4.2.2.5.7 Conclusion – Comparison with Sac Metro AQMD Rule 496**

District Rule 4570 and Sac Metro Rule 496 are equivalent for large CAFs that are dairies and poultry operations, therefore, they are equally stringent for dairy and poultry CAFs. Since District Rule 4570 details mitigation measures for additional large CAFs, District staff concludes that District Rule 4570 is more stringent for large CAFs other than dairies and poultry operations.

### **4.2.2.6 Imperial County APCD Rule 217 – Large Confined Animal Facilities Permits Required and ICAPCD Policy Number 38**

Imperial County APCD Rule 217 is a permits rule. The rule directs operators to a policy for the mitigation measures. The policy also spells out the number of mitigation measures the operator must implement for each operation within the CAF. The



following discussion compares the mitigation measures in the Imperial County policy to the measures in District Rule 4570.

#### **4.2.2.6.1 Applicability/Exemption/Large CAF Definition**

Although the definition of large CAF is the same for both air districts, Imperial County Policy Number 38 only lists mitigation measures for dairy operations and beef feedlot operations. Imperial County APCD policy's menu of mitigation measures is essentially identical to the Class One mitigation measures in District Rule 4570. Imperial County policy does not have a separate group of mitigation measures equivalent to the District's Class Two mitigation measures to offer large CAF operators.

#### **4.2.2.6.2 Requirements for Dairy Large CAFs**

##### **Feed Mitigation Measures**

District Rule 4570 has seven Class One mitigation measures for feed and three Class One mitigation measures for silage. There are three Class Two mitigation measures for silage. Operators must implement four feed mitigation measures and one silage mitigation measure for five total feed mitigation measures. Imperial County APCD policy has a menu of nine mitigation measures for feed with mitigation measures for silage included in the menu. Imperial County APCD policy requires the selection of three feed mitigation measures. Including the silage mitigation measures, this is two less mitigation measures than required by District Rule 4570. Therefore, District Rule 4570 is more stringent than the Imperial County APCD policy.

Although the dairy feed mitigation measures are identical in both air districts, the compliance time for the mitigation measures in the Imperial County APCD are longer than for those in District Rule 4570. For removal of spilled or spoiled feed the compliance time is 30 days for Imperial County APCD versus 14 days for the District. The compliance time for removing feed after a rain event is 72 hours in the Imperial County policy and 24 hours in District Rule 4570. For these mitigation measures, the District rule is more stringent.

##### **Milk Parlor Mitigation Measures**

Imperial County Policy has only one mitigation measure for the milk parlor. The District rule has one Class One and one Class Two mitigation measure, from which operators are required to choose at least one.

##### **Freestall Mitigation Measures**

District Rule 4570 has eight Class One and one Class Two mitigation measures, from which facilities are required to implement at least two. Imperial County APCD policy has eight mitigation measures, from which operators are required to choose at least two.

The Class Two mitigation measure option offered by District Rule 4570 is *vacuuming wasted instead of scraping or flushing and injecting or incorporating into land with 72 hours of removal*.

Imperial County APCD policy has one mitigation measure that is more stringent than the corresponding District Rule 4570 measure. The Imperial County APCD policy requires freestall beds to be raked/harrowed/graded at least twice every 7 days, whereas District Rule 4570 requires this measure to be carried out only once every 14 days.

### **Corral Mitigation Measures**

District Rule 4570 has 15 Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least six. Imperial County APCD Policy Number 38 has eight mitigation measures, from which facilities are required to choose at least four.

For five of the mitigation measures, the compliance times differ significantly between the District rule and the Imperial County APCD policy. For these measures, the Imperial County policy compliance times are longer than the District rule time lines. For these five mitigation measures, the District rule is more stringent because the District rule's compliance time is much shorter for otherwise identical mitigation measures.

Imperial County APCD policy has one mitigation measure - inspect water pipes and troughs and repair leaks - that is more stringent than the corresponding District Rule 4570 measure. The policy requires that this measure to be carried out daily, whereas District Rule 4570 requires it to be carried out once every 14 days.

The two air districts also differ slightly in the categorization of the mitigation measure relating to corrals soil additives, but this difference is not expected to have any effect on the stringency of the mitigation measures.

### **Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 has five Class One mitigation measures and three Class Two mitigation measures, from which operators are required to choose at least two. Imperial County APCD policy has four mitigation measures from which facilities are required to choose at least one. Since operators must implement fewer mitigation measures under the Imperial County APCD policy than required by District Rule 4570, District Rule 4570 is more stringent.

There are a few differences in the Imperial County APCD policy mitigation measures themselves, when compared to District Rule 4570. Imperial County APCD policy requires that manure piles are covered year round whereas District Rule 4570 requires that the piles be covered from October through May – the months the District is most likely to have rainfall. Storage in anaerobic digesters or aerobic lagoons is not an option

for Imperial County operations. Separated solids piles not specifically addressed in the Imperial County policy. District Rule 4570 does not have a “no-storage” option for operators. These differences, although worth noting, are not expected to influence the effectiveness of Rule 4570.

### **Liquid Waste Mitigation Measures**

District Rule 4570 has five Class One mitigation measures and five Class Two mitigation measures, from which facilities are required to choose at least one. Imperial County APCD policy has five mitigation measures, from which operators are required to choose at least one. The District’s Class One mitigation measures and the Imperial County APCD policy mitigation measures are identical.

### **Land Application of Manure Mitigation Measures**

District Rule 4570 has six Class One mitigation measures, from which facilities are required to choose at least two. Imperial County APCD policy has a menu of five mitigation measures from which operators are required to choose two. Imperial County APCD allows the application of composted manure with a moisture content of less than 50% as a mitigation measure. Since the material has been through a composting process, the District views the composted material as no longer animal manure, so the not-apply mitigation measure in the District rule and the application of composted manure in the Imperial County policy are equivalent.

#### **4.2.2.6.3 Requirements for Beef Feedlot Large CAFs**

### **Feed Mitigation Measures**

District Rule 4570 has seven Class One mitigation measures for feed and three Class One mitigation measures for silage. There are three Class Two mitigation measures for silage. Operators must implement four feed mitigation measures and one silage mitigation measure for five total feed mitigation measures. Imperial County APCD policy has a menu of eight mitigation measures for feed with mitigation measures for silage included in the menu. Imperial County APCD policy requires the selection of three feed mitigation measures. Including the silage mitigation measures, this is two less mitigation measures than required by District Rule 4570. Therefore, District Rule 4570 is more stringent than the Imperial County APCD policy

Although the feed mitigation measures are identical, the compliance time for the mitigation measures in the Imperial County APCD are longer than for those in District Rule 4570. For removal of spilled or spoiled feed the compliance time is 30 days for Imperial County APCD versus 14 days for the District. The compliance time for removing feed after a rain event is 72 hours in the Imperial County policy and 24 hours in District Rule 4570. For these mitigation measures, the District rule is more stringent.

## **Animal Housing Mitigation Measures**

District Rule 4570 has 14 Class One mitigation measures and two Class Two mitigation measures, from which operators are required to choose at least seven. Imperial County APCD Policy Number 38 has nine mitigation measures, from which facilities are required to choose at least four. Since operators in Imperial County are required to implement fewer mitigation measures from a menu that is essentially identical to District Rule 4570, District Rule 4570 is more stringent.

For five of the mitigation measures, the compliance times differ significantly between the District rule and the Imperial County APCD policy. For these measures, the Imperial County policy compliance times are longer than the District rule time lines. For these five mitigation measures, the District rule is more stringent because the District rule's compliance time is much shorter for otherwise identical mitigation measures.

Imperial County APCD policy has one mitigation measure - inspect water pipes and troughs and repair leaks - that is more stringent than the corresponding District Rule 4570 measure. The policy requires that this measure to be carried out daily, whereas District Rule 4570 requires it to be carried out once every 14 days.

## **Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 has four Class One mitigation measures and four Class Two mitigation measures, from which facilities are required to choose at least one. Imperial County APCD policy has five mitigation measures from which facilities are required to choose at least one.

Imperial County APCD policy requires manure piles to be covered year round whereas District Rule 4570 requires that the piles be covered from October through May – the months most likely to have rainfall. District Rule 4570 does not have a “no-storage” option for operators. Composting of manure on-site is a menu option offered by the Imperial County policy, whereas the District rule lists this as a Class Two mitigation measure. The differences between the two districts, although noteworthy are not expected to influence the effectiveness of Rule 4570.

## **Liquid Manure Handling**

Imperial County APCD policy does not address liquid manure handling for beef feedlot operations. District Rule 4570 has a menu of options – five Class One and four Class Two – from which the operator must choose one mitigation measure.

## **Land Application of Manure Mitigation Measures**

District Rule 4570 has six Class One mitigation measures, from which facilities are required to choose at least two. Imperial County APCD policy has a menu of five mitigation measures from which operators are required to choose two. Imperial County

APCD allows the application of composted manure with a moisture content of less than 50% as a mitigation measure. Since the material has been through a composting process, the District views the composted material as no longer animal manure, so the not-apply mitigation measure in the District rule and the application of composted manure in the Imperial County policy are equivalent.

#### **4.2.2.6.4 Requirements for Other Large CAFs**

In the same manner as for dairy and beef feedlot operations, District Rule 4570 specifies mitigation methods for large confined animal facilities other than dairies and beef feedlots. Imperial County APCD Policy 38 only has mitigation measures for dairy and beef feedlot operations. In comparing the two documents, District Rule 4570 is the more comprehensive document.

#### **4.2.2.6.5 Requirements – Suspension and Substitution of Mitigation Measures**

Both rules allow for substitution of one mitigation measure with an equivalent or more stringent one with the submission of the appropriate application. District Rule 4570 also allows the temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. The Imperial County APCD policy does allow for temporary suspension of mitigation measures under circumstances similar to District Rule 4570.

#### **4.2.2.6.6 Testing, Monitoring, Recordkeeping Requirements**

District Rule 4570 requires records to be maintained and retained for at least five years, whereas Imperial County AQMD Rule 217 requires records to be retained for two years. District Rule 4570 therefore has a more stringent record retention requirement.

District Rule 4570 requires facilities not subject to the mitigation measure requirements to maintain sufficient records to demonstrate their exemption status. Facilities subject to the mitigation measure requirements must maintain sufficient records to demonstrate implementation of each mitigation measure selected. Facilities must also maintain animal population records. Imperial County AQMD Rule 217 requires the maintenance of animal population records but does not require specific records needed to demonstrate implementation of each mitigation measure selected. District Rule 4570 is therefore more stringent in the type of records required to be maintained.

#### **4.2.2.6.7 Conclusion – Comparison with Imperial County AQMD Rule 217**

Overall, District Rule 4570 is more comprehensive than Imperial County AQMD Rule 217 because it covers more types of CAFS and overall, is more stringent.

#### **4.2.2.7 Butte County AQMD Rule 450 – Large Confined Animal Facilities**

Butte County AQMD Rule 450 is a permits rule. It outlines, in general terms, the requirements for a complete permit application and how the staff would evaluate and approve/disapprove the permit application.

##### **4.2.2.7.1 Applicability/Exemption/Large CAF Definition**

The definition of large CAF is identical for both rules, with the exception of horse facilities. District Rule 4570 defines a large horse CAF as 3,000 head, whereas Butte County AQMD Rule 450 defines it as 2,500 head. Also, the Butte County AQMD rule specifically mentions lambs in the sheep/goat large CAF definition, whereas the District rule only mentions sheep and goats.

##### **4.2.2.7.2 Large CAF Requirements**

The Butte County AQMD rule requires large CAFs to obtain a permit and to submit and implement a mitigation plan; however the number of mitigation measures required and specific mitigation measures is not listed. Additionally the mitigation measures are to meet RACT. District Rule 4570 spells out the number of mitigation measures an operator is required to implement and has a menu of specific mitigation measures. Operators are required to meet BACT. In this regard, District Rule 4570 is more stringent than the Butte County rule.

##### **4.2.2.7.3 Testing, Records, and Reporting Requirements**

The Butte County rule requires that all CAFs record the daily number of animals on-site. These records are to be kept on-site for two years and presented if requested. District Rule 4570 requires testing and records be kept to demonstrate compliance with the operator's selected mitigation measures. The records are to be kept for five years and presented upon the request of EPA, ARB, or the District. Because District Rule 4570 covers testing, as well as having a longer record retention time, it is more stringent than Butte County AQMD Rule 450.

##### **4.2.2.7.4 Conclusion – Comparison with Butte County AQMD Rule 450**

Overall, District Rule 4570 is more comprehensive than Butte County AQMD Rule 450 because it covers more types of CAFS and overall, is more stringent.

#### **4.2.3 EFFECTIVENESS OF RULE 4570**

The number of mitigation measures required for each CAF are sufficient and effective in obtaining the required reductions regardless of the type of mitigation measure selected. In cases where similar measures or control efficiency exist under a category, Rule 4570 only allows one of those measures to be selected and account towards the total overall

number of mitigation measures required, eliminating the possibility that the required reductions are not achieved.

The District performed an emission reduction analysis as Appendix B in the Rule 4570 Staff report, which demonstrated that even if the least costly mitigation measures were selected, the facility would still manage to achieve the emission reductions needed to be in compliance with the Rule. The Staff Report also mentions that the least costly controls are also the least efficient in reducing emissions amongst all the controls. Since facilities' will most likely elect to implement measures that are the least costly and since the analyses in appendix B demonstrates that the emission reduction requirements would be met by selecting the least costly measures, then it is reasonable to state that any combination of mitigation measures will achieve the required reductions.

#### **4.2.4 WHY ADDITIONAL MITIGATION MEASURES (CLASS ONE AND CLASS TWO) ARE BEYOND RACT**

Rule 4570 has two classes of mitigation measures available as options. Class One mitigation measures are generally management practices such as washing off manure more frequently, covering feed and manure piles, and manipulating animal diets. Class one measures have been demonstrated in the Staff Rule to meet BARCT. Class Two mitigation measures are more technically advanced capture and control measures such as enclosing animal housing and venting to a control device, storing feed and manure in bags or enclosed structures and venting to a control device, and using digesters or advanced composting methods for manure treatment. Class two measures have been identified as measures/technology being beyond BARCT.

Although there is potential for some of the class two measures to achieve a significant amount of reductions, there exists much uncertainty as to the proper operation and control of these mitigation measures. Based on the most recent information on similar installation and/or studies, some of the measures serve to the opposite for pollution control and may not necessarily be superior to the Class one measures. The issues associated with the Class two measures are demonstrated below:

Enclose silage in a bag and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%. Enclose silage in a weatherproof structure and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%.

The majority of dairies store the silage piles underneath a tarp or in an Agbag. The entire pile is covered except for the face of the pile. The face of the pile is kept open due to the continual need to extract the silage for feed purposes. The silage pile is disturbed 2-3 times per day. Because of the ongoing disturbance to these piles, it makes it extremely difficult to design a system to capture the emissions from these piles. In fact, as far as the District is aware, no system has been designed to successfully extract the gases from the face of the pile to capture them, and, as important, no study has

assessed the potential impacts on silage quality of a continuous air flow across the silage pile, as would be required by such a collection system. Therefore, this technology is not only unproven but the ramifications of installing such a system are yet unknown.

Enclose and vent the milk parlor to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80% when animals are in the parlor.

Currently, there is no dairy as far as the District is aware of that has a fully enclosed milking parlor system. The milking parlor consists of an attached cow holding area, which temporarily holds the cows as they make their way into the milk parlor. This area is generally fully exposed with a partial cover. In order to capture all of the gases emitted from the milking parlor, and to keep an appropriate negative pressure throughout the system, the holding area would also need to be entirely enclosed. The capital required to enclose this large area would also be significant. In addition, the milking parlor has the least amount of emissions at the entire dairy. Even if such a system could be fully enclosed, a great deal of energy would be required to circulate the air and vent the gases into a control device.

This technology is still unproven and may pan out to be ineffective due to the minor source of emissions. In addition, fully enclosing animals has the potential of causing a great deal of stress and negative health impacts to the animals, which have yet to be evaluated. Therefore, this technology may not only be feasible but may prove to be less superior to other mitigation measures.

House animals in an enclosure vented to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%.

Although there are smaller dairy farms that have partially enclosed freestall barns, these barns are not fully enclosed and none of the barns have been found to vent the exhaust through a collection device. These partially enclosed barns are also found in the Midwest where the temperature is much cooler than the Valley. Freestall barns are large structures and the airflow requirements through these barns are also extremely high, primarily for herd health purposes (for cooling the cow). The airflow requirements will be even higher in the San Joaquin valley, where temperatures reach in excess of 110 degrees in the hot summer. Milk cows have a very low threshold for heat stress, which can occur at temperatures of greater than 70 degree F. Therefore, one of the most critical factors in realizing a completely enclosed barn will be to provide sufficient amount of cooling so as not to cause a detriment to herd health. In addition, collection and control of the exhaust including the large amounts of airflow have not yet been achieved by any facility. Due to these difficulties and the lack of any installations of this type of technology, it is difficult to say at this time whether this technology is considered feasible.



Cover the lagoon or storage pond and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.

The covering of a lagoon in itself has been achieved in many facilities; however the control of the biogas poses some air quality challenges. There is a negative impact of emissions of other pollutants resulting from the combustion of biogas generated by anaerobic digestion. These pollutants include oxides of nitrogen (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and carbon monoxide (CO). Current air quality modeling has demonstrated that the high levels of biogenic and anthropogenic VOC emissions in the San Joaquin Valley Air Basin cause NO<sub>x</sub> to be the limiting reactant for ozone production. Therefore, in terms of ozone production, large reductions in VOC emissions can be offset by relatively smaller increases in NO<sub>x</sub> emissions. This factor must be considered when determining if anaerobic digesters will reduce ozone formation in the San Joaquin Valley Air Basin. Furthermore, several recent studies have demonstrated that particulate matter, especially fine particulate (PM<sub>2.5</sub>) such as that produced by combustion, can pose a significant health risk. Since VOC emissions from waste storage lagoons are lower than previously thought, it is very likely that emissions of combustion contaminants (NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO), including precursors for the formation ozone and fine particulate, will offset the benefits of any VOC reductions from the lagoons.

In addition, although there are several digesters in operation at agricultural facilities, particularly dairies, only one installation in the District is equipped with advanced emission controls to reduce NO<sub>x</sub>. This installation has faced considerable difficulty in meeting the very strict NO<sub>x</sub> requirements that are needed in order for digesters to have an overall positive affect on air quality. The installation has had a variance for more than six months and will require even more time because of the inability to meet the NO<sub>x</sub> emission limit in the permit. Other installations are currently uncontrolled and have some of the highest levels of NO<sub>x</sub> from stationary equipment in the District resulting in an overall increase in ozone-forming potential in the San Joaquin Valley.

In conclusion, anaerobic digesters with no or limited controls for combustion pollutants are not beneficial to the protection of air quality in the San Joaquin Valley unless significantly controlled. Although technologies for use of biogas with low NO<sub>x</sub> emissions (such as fuel cells) are being developed, these technologies are rarely used and the expense of such technologies is clearly far above the level of RACT including BARCT. These technologies have even yet to be considered Achieved in Practice as part of the District's BACT analysis.

While engineered controls are available and included as options in the rule, not only are some of them not functional or economically feasible, they are beyond BARCT and RACT.

### **4.3 RULE 4570 IS LEGALLY AND PRACTICALLY ENFORCEABLE**

Pursuant to Rule 4570 Section 7.1.1.2 , owners/operators subject to the requirements of Rule 4570 (section 5.0) shall maintain the following:

- Copies of all of the facility's permits
- Copies of all laboratory tests, calculations, logs, records, and other information required to demonstrate compliance with all applicable requirements of this rule, as determined by the APCO, ARB, EPA.
- Records of the number of animals of each species and production group at the facility on the permit issuance date. Quarterly records of any changes to this information shall also be maintained, (e.g. Dairy Herd Improvement Association records, animal inventories done for financial purposes, etc.)

Sections 7.1.1.2.4 through 7.1.12.21 require specific record keeping conditions for each mitigation measure.

*Section 7.2 requires specific monitoring or source testing conditions for each mitigation measure.*

Because permit rules and prohibitory rules have different purposes, they are not directly comparable in terms of monitoring, testing, and records. Prohibitory rules include these requirements so that the operator can demonstrate compliance with the rule's control requirements. In a permit rule, it is expected that required monitoring, testing, and records would be outlined in a prohibitory rule applicable to the source category.

All rules except District Rule 4570 and SacMetro Rule 459 are permit rules. These rules have one records provision - all CAF operators must keep records of the number of animals at the facility. By contrast, the SacMetro and District rules, which are prohibitory rules, outline specific records for each type of mitigation measure performed in addition to the number-of-animals provision. This means the SacMetro and District rules are more stringent than the other air districts' rules, but that is to be expected given the difference in the types of rules being compared (permit versus prohibitory).

The monitoring and measurement requirements of Rule 4570, which include minimum testing frequency, are designed to ensure that adequate testing is conducted to demonstrate compliance with the appropriate mitigation measures and such measures are operating in a manner that optimizes the VOC reductions.

It should also be noted that owners may use documents, such as Regional Water Quality Board Waste Nutrient Management Plans that list the numbers of animals in each production group (e.g. calves, heifers, milkers, and dry cows) to comply with this monitoring requirement. The rule will not require owners/operators to maintain a set of records exclusively for the use of the San Joaquin Valley Air District. Other monitoring and testing requirements only apply to facilities that choose mitigation measures where such monitoring or testing would assist in demonstrating compliance.

#### 4.4 EMISSION REDUCTIONS ACHIEVED BY RULE 4570 MEET DISTRICT PLANNING REQUIREMENTS

Although some of the individual mitigation measures in District Rule 4570 were in use before Rule 4570 was adopted, there would be no requirement to keep emission-reducing measures in place if District Rule 4570 did not exist. Rule 4570 requires that large CAF operators put together a suite of mitigation measures into a mitigation plan which would reduce VOC emissions for every process within the CAF. This provides operators flexibility to reduce emissions in the most effective way for their facility while assuring that VOC emissions from all processes within the facility are controlled. Within the confines of Rule 4570, operators can change their mitigation measures through mitigation plan updates. The new mitigation measures could not be put in place until approved by the District. In this way, the mitigation plan to become a "living document" that allows the operators and the District to implement the best controls as operations change and scientific knowledge increases. The following paragraphs review the absolute emission control effectiveness of Rule 4570 in terms of facility mitigation plans rather than individual mitigation plans.

According to USDA records, over 59% of California's cattle and 80% of the state's swine population are raised in the San Joaquin Valley Air Basin (SJVAB). Approximately 42% of these animals are raised in facilities defined as "large CAF". In contrast, the majority of poultry, goats, sheep, and other animals are raised in facilities below the "large CAF" definition. Therefore, poultry, goats, sheep and other animals are not subject to the control requirements of the rule and no emission control effectiveness was calculated for these CAFs.

In determining the emission control effectiveness, District staff assumed that operators would choose to implement the lowest cost mitigation measures. Also assumed was control effectiveness of 10% for mitigation measures that did not have peer-reviewed research associated with them. With both of these assumptions, District staff calculated the control efficiency for each operation within a given type of CAF, then the overall control effectiveness for the given type of CAF was determined. The results of that analysis are shown in the table below.

<b>Estimated Overall Control Efficiency by CAF Type (after full implementation)</b>					
<b>Type of CAF</b>	<b>Dairy</b>	<b>Beef</b>	<b>Other Cattle</b>	<b>Swine</b>	<b>All Others</b>
<b>Percent Control</b>	36%	36%	42%	72%	Not affected by rule

Taken as a whole, there are significant emission reductions associated with District Rule 4570 compared to uncontrolled operations, even with conservative control efficiencies assumed for individual mitigation measures. The calculated overall control efficiency range is 36% to 72% with large swine CAFs having the highest overall VOC control efficiency.

## 4.4.2 Least Costly Mitigation Measure Requirements are Effective

The number of mitigation measure required for each CAF are sufficient and effective in obtaining the required reductions regardless of the mitigation measure selected. In several cases, Rule 4570 only allows one of multiple measures under a category to be selected that go towards the total overall number required due to similar control efficiencies or similarity in the type of mitigation. The analysis shown below and also included in Appendix B of Rule 4570 Staff report, demonstrates that even if the least costly mitigation measures are selected, the facility would still manage to get the emission reductions needed and be in compliance with the Rule. The Staff Report also mentions that the least costly controls are also the least efficient in reducing emissions amongst all the controls. Since facilities' will most likely elect to implement measures that are the least costly and since the analyses in appendix B of Rule 4570 staff report demonstrates that the emission reduction requirements would be met by selecting the least costly measures, then it is reasonable to state that any combination of mitigation measures will achieve the required reductions. In addition, since the mitigation measures in Rule 4570 meet BARCT, then these measures also meet RACT.

### 4.4.2.1 EMISSION REDUCTION ANALYSIS

#### 4.4.2.1.1 Background

In performing the analysis, several generalizations were made to reflect conservative emission reduction results. These include:

- All mitigation measures achieve VOC reductions from facilities that use the mitigation measures. The rule achieves reductions by requiring the mitigation measure or by prohibiting the owner/operator from ceasing to use the mitigation measure.
- Facilities will only implement the number of mitigation measures required by Proposed Rule 4570. Staff acknowledges that industry may do more than is required. Since the additional mitigation measures that industry implements that go beyond rule requirements can be ceased at any time, thus staff does not believe these reductions are permanent and the direct result of Rule 4570. Therefore, staff does not believe that it is appropriate to claim such reduction or costs in the Rule 4570 development process.
- Facilities will choose the mitigation measures that are lowest cost BARCT options. Again, staff acknowledges that facilities may choose more costly options. Additionally many existing facilities already have installed more costly options, which are more effective at reducing VOC emissions. However, as mentioned in the previous bullet owner/operators could cease using the more costly option at anytime, thus staff does not believe that it is appropriate to claim reduction achieved in cases where the more costly option achieves greater reductions than the less costly option.
- In some cases, no data could be found in the literature search on which to base a control efficiency factor for these practices. The District has conservatively assumed a minimal 10% control effectiveness. As information becomes

available, it will be added to this methodology. Additional air quality benefits and control effectiveness for these practices would need to be further evaluated through research studies and literature searches.

- Emissions at each source are affected by emission reductions achieved from sources upstream of that source. For example, a mitigation measure for feed that reduces VOC in manure by 10% causes the emission factor for the lagoon, where the manure is processed, to have 10% less emissions.
- Approximately 29% percent of the dairies have no freestalls, based on California Dairy Farmers Association (CDFA) data provided by Mike Francesconi.

#### 4.4.2.1.2 Excluded Activities and Facilities

Based on the assumptions above, staff analyzed the cost effectiveness of least expensive BARCT options that owners/operators would likely choose to implement.

#### 4.4.2.1.3 Summary of Emissions and Reductions

Tables 3 through 7 summarize the emission reduction calculations from the control measures included in the rule. Details of those calculations are discussed in Sections D through G.

#### 4.4.2.1.4 Control Efficiency Calculations for Dairies

The calculations for dairies are based on the following breakdown of the emission factor by source category.

<b>Emissions from Dairy Locations</b>			
<b>Emission Unit</b>	<b>Emission Factors (Freestall Dairies)</b>	<b>Emission Factors (Dairies without Freestalls)</b>	<b>Reference</b>
Manure & Feed in Housing	5.5 lb/hd-yr	4.8 lb/hd-yr	12/14/05 Draft Breakdown for Permitting
Enteric Emissions in Housing	7.6 lb/hd-yr	7.6 lb/hd-yr	12/14/05 Draft Breakdown for Permitting
Enteric Emissions in Milking Center	0.7 lb/hd-yr	0.7 lb/hd-yr	12/14/05 Draft Breakdown for Permitting
Manure Emissions in Milking Center	0.2 lb/hd-yr	0.2 lb/hd-yr	12/14/05 Draft Breakdown for Permitting
Liquid Manure Handling	2.7 lb/hd-yr	2.3 lb/hd-yr	12/14/05 Draft Breakdown for Permitting
Land Application	5.0 lb/hd-yr	3.7 lb/hd-yr	12/14/05 Draft Breakdown for Permitting
<b>SUBTOTAL</b>	<b>21.7 lb/hd/y</b>	<b>19.3 lb/hd-yr</b>	<b>Value used for permitting purposes and emission inventory calculations</b>

Solid Bedding Storage Piles	0.2 lb/hd-yr	0.2 lb/hd-yr	1/26/05 Schmidt Flux Chamber Presentation for ARB Meeting
Feed Piles	0.63 lb/hd-yr	0.63 lb/hd-yr	Data submitted to DPAG by Schmidt via ARB. NOTE: this only considered feed in feedlanes. It did not include emissions from every feed emission source.

Please note that the values in the above table for: manure & feed in housing; enteric emissions in housing; enteric emissions in milking center; manure emissions in milking center; liquid manure handling; and land application subtotal to the current emission factors for permitting purposes. Since these values are used for permitting, these (21.7 lb/hd-yr and 19.3 lb/hd-yr) were used in all calculations which applied to the entire facility to avoid overestimating emissions and emission reductions and maintain consistency.

However, the Dairy Permitting Advisory Committee and APCO reports and the permit department noted that not all emission sources were included in these estimates. Two sources for which emissions were not counted are the solid bedding storage piles and the feed piles outside of the animal housing. Since there is research documenting emission from and VOC control options for these sources, staff estimated the emissions from these sources by using data from Schmidt's research. These emission factors are only used for calculating reductions from mitigation measures that control VOC emissions from solid bedding or feed storage piles.

Based on Table 8 and the CDFA data showing that approximately 29% of dairies have no freestalls, staff calculated the weighted averages for emissions for each area on the dairy and the facilities as a whole by the following equation:

$$\text{Weighted average} = \text{Emission factor for facilities with freestalls} \times 71\% + \text{Emission factor for facilities with no freestalls} \times 29\%$$

The weighted averages, which staff used to calculate control efficiency of various control measures, are listed below.

<b>Weighted Emissions from Dairy Locations</b>			
<b>Emission Unit</b>	<b>Emission Factors (Freestall Dairies)</b>	<b>Emission Factors (Dairies without Freestalls)</b>	<b>Weighted Emission Factors</b>
Manure & Feed in Housing	5.5 lb/hd-yr	4.8 lb/hd-yr	5.3 lb/hd-yr
Enteric Emissions in Housing	7.6 lb/hd-yr	7.6 lb/hd-yr	7.6 lb/hd-yr
Enteric Emissions in Milking Center	0.7 lb/hd-yr	0.7 lb/hd-yr	0.7 lb/hd-yr
Manure Emissions in Milking Center	0.2 lb/hd-yr	0.2 lb/hd-yr	0.2 lb/hd-yr

Liquid Manure Handling	2.7 lb/hd-yr	2.3 lb/hd-yr	2.6 lb/hd-yr
Land Application	5.0 lb/hd-yr	3.7 lb/hd-yr	4.6 lb/hd-yr
<b>SUBTOTAL</b>	<b>21.7 lb/hd/y</b>	<b>19.3 lb/hd-yr</b>	<b>21.0 lb/hd-yr</b>
Solid Bedding Storage Piles	0.2 lb/hd-yr	0.2 lb/hd-yr	0.2 lb/hd-yr
Feed	0.63 lb/hd-yr	0.63 lb/hd-yr	0.63 lb/hd-yr

## 1. FEED PRACTICES CONTROL MEASURES

### Option 1: Feeding according to NRC guidelines

This practice is intended to minimize the excess nutrients fed to the animals. Based on research suggesting that nitrogen content in feed is directly proportional to nitrogen content in manure, staff believes that feeding according to the NRC guidelines, which minimizes excess nutrients in the diet, would reduce VOC emissions. Since there is little data quantifying this reduction, the 10% default is assumed. Since it reduces the content of VOC precursors being fed to the animal (entering the animal) it will reduce the VOC precursors exiting the animal and thus being treated in each animal waste system. It will also reduce the emissions from feed in the housing and stockpiles because there will be less VOC precursors in the feed, which could eventually decompose. Therefore, the 10% reduction was applied to the facility wide emission factors. This is expected to be used by all facilities since reductions in excess nutrients, such as protein, in feed would not increase costs significantly. Any additional labor employed to determine what feed formulations would meet NRC guidelines would likely be offset by lower costs for feed due to lower nutrient content. The reduction calculations are:

Option 1 Reductions = 10%

### Option 2: Store grain in a weatherproof storage structure from October through May

This measure is intended to reduce excess moisture. Since the microorganisms that degrade organic material to form VOCs require moisture, this is expected to reduce the VOC emissions from the feed storage. Since there is little data quantifying this reduction, the 10% default is assumed. However, it only affects the emissions from feed and these emissions were already reduced by 10% due to implementing an NRCS diet. The reduction calculations are:

Option 2 Reductions = 0.63 lb/hd-yr (emissions from feed) x 90% (emissions remaining after implementing Option 1) x 10% (control efficiency from Option 2) = 0.06 lb/hd-yr

This is out of an emission factor of 21.0 lb/hd-yr.

The percent reductions =  $0.06 \text{ lb/hd-yr} \div 21.0 \text{ lb/hd-yr} = 0.3\%$

#### Option 3 and 4: Two mitigation measures for cleaning feed from housing

These measures are intended to minimize moisture, surface area for VOCs to move from the feed to the atmosphere, and anaerobic digestion due to wet conditions and thick depths of animal waste. Data suggests that these practices would minimize VOC emissions, however there are no peer-reviewed articles that quantify this. Therefore, staff assumed a default reduction of 10% for each measure. However, it only affects the emissions from feed and these emissions were already reduced by Option 1 and Option 2.

Option 3 Reductions =  $0.63 \text{ lb/hd-yr}$  (emissions from feed) x 90% (emissions remaining after implementing Option 1) x 90% (emissions remaining after implementing Option 2) x 10% (control efficiency) =  $0.05 \text{ lb/hd-yr}$

Option 4 Reductions =  $0.63 \text{ lb/hd-yr}$  (emissions from feed) x 90% (emissions remaining after implementing Option 1) x 90% (emissions remaining after implementing Option 2) x 90% (emissions remaining after implementing Option 3) x 10% (control efficiency) =  $0.05 \text{ lb/hd-yr}$

The total reductions from Option 3 and 4 =  $0.05 \text{ lb/hd-yr}$  (Option 3) +  $0.05 \text{ lb/hd-yr}$  (Option 4) =  $0.10 \text{ lb/hd-yr}$

This is out of an emission factor of  $21.0 \text{ lb/hd-yr}$ .

The percent reductions =  $0.10 \text{ lb/hd-yr} \div 21.0 \text{ lb/hd-yr} = 0.5\%$

## **2. SILAGE PRACTICES**

#### Option 5: Silage practices

These measures are intended to minimize moisture, surface area for VOCs to move from the feed to the atmosphere, anaerobic digestion due to wet conditions, and excess nutrients in animal waste due to silage practices. Data suggests that these practices would minimize VOC emissions, however there are no peer-reviewed articles that quantify this. Therefore, staff assumed a conservative reduction of 10% for each measure. However, it only affects the emissions from feed and these emissions were already reduced by Option 1.

Option 5 Reductions =  $0.63 \text{ lb/hd-yr}$  (emissions from feed) x 90% (emissions remaining after implementing Option 1) x 10% (control efficiency) =  $0.06 \text{ lb/hd-yr}$

This is out of an emission factor of  $21.0 \text{ lb/hd-yr}$ .



The percent reductions =  $0.06 \text{ lb/hd-yr} \div 21.0 \text{ lb/hd-yr} = 0.3\%$

### 3. MILK PARLOR PRACTICES

#### Option 6: Flush/clean milk parlor after each milking

In the studies used to calculate the emission factor this practice was being done. Therefore, the baseline assumes that all facilities implement this practice. Thus, no reduction from the baseline is anticipated. This measure was included to ensure all current and future facilities implement practices accounted for in the baseline emission estimate.

### 4. FREESTALL PRACTICES

#### Options 7 and 8: Vacuum or scrape freestalls after each milking or flush more frequently than milking and rake, harrow, scrape, or grade bedding at least once every two weeks

Typically, facilities flush once per milking or scrape once a day (once every two milkings). Typically, facilities clean to bedding no more than once a month. By cleaning twice as frequently you cut the time manure is in the freestalls by half. Therefore you reduce the emissions in the freestalls by 50%. The freestall emissions are approximately 97% of the total emissions from manure and feed in the housing (3% of the emissions are in the corrals). The reduction calculations are:

$$\begin{aligned} \text{Freestall emission} &= 5.3 \text{ lb/hd-yr} \times 97\% \text{ (emissions from freestalls)} \\ &= 5.14 \text{ lb/hd-yr from freestalls.} \end{aligned}$$

$$\begin{aligned} \text{Options 7 and 8 Reductions} &= 5.14 \times 90\% \text{ (emissions remaining after implementing} \\ &\text{Option 1)} \times 98\% \text{ (emissions remaining after implementing Option 3 and 4)} \times 50\% \\ &\text{(control efficiency)} = 2.3 \text{ lb/hd-yr} \end{aligned}$$

This is out of an emission factor of 21.7 lb/hd-yr, but only affects 71% of the facilities (facilities with freestalls).

$$\text{The percent reductions} = 2.3 \text{ lb/hd-yr} \div 21.7 \text{ lb/hd-yr} \times 71\% = 8\%$$

### 5. CORRAL PRACTICES

#### Option 9, 10, 11, 12, 13, and 14: All housing measures to clean corrals, manage manure depth, and minimize moisture

These are intended to minimize moisture and anaerobic digestion due to wet conditions or thick depths of manure that prevents the manure from drying completely and oxygen continuing to come in contact with all animal waste in the

pens and corrals. Data suggests that this would minimize VOC emissions, however there are no peer-reviewed articles that quantify this. Therefore, staff assumed a default reduction of 10% for each measure. The corrals account for approximately 3% of the emissions from the animal housing. The reduction per measure is:

$$\begin{aligned}\text{Corral emissions} &= 5.3 \text{ lb/hd-yr} \times 3\% \text{ (emissions from corrals)} \\ &= 0.16 \text{ lb/hd-yr from corrals}\end{aligned}$$

$$\text{Option 9 Reductions} = 0.16 \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 10\% \text{ (control efficiency)} = 0.01 \text{ lb/hd-yr}$$

$$\text{Option 10 Reductions} = 0.16 \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 90\% \text{ (emissions remaining after implementing Option 9)} \times 10\% \text{ (control efficiency)} = 0.01 \text{ lb/hd-yr}$$

$$\text{Option 11 Reductions} = 0.16 \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 90\% \text{ (emissions remaining after implementing Option 9)} \times 90\% \text{ (emissions remaining after implementing Option 10)} \times 10\% \text{ (control efficiency)} = 0.01 \text{ lb/hd-yr}$$

$$\text{Option 12 Reductions} = 0.16 \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 90\% \text{ (emissions remaining after implementing Option 9)} \times 90\% \text{ (emissions remaining after implementing Option 10)} \times 90\% \text{ (emissions remaining after implementing Option 11)} \times 10\% \text{ (control efficiency)} = 0.01 \text{ lb/hd-yr}$$

$$\text{Option 13 Reductions} = 0.16 \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 90\% \text{ (emissions remaining after implementing Option 9)} \times 90\% \text{ (emissions remaining after implementing Option 10)} \times 90\% \text{ (emissions remaining after implementing Option 11)} \times 90\% \text{ (emissions remaining after implementing Option 12)} \times 10\% \text{ (control efficiency)} = 0.01 \text{ lb/hd-yr}$$

$$\text{Option 14 Reductions} = 0.16 \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 90\% \text{ (emissions remaining after implementing Option 9)} \times 90\% \text{ (emissions remaining after implementing Option 10)} \times 90\% \text{ (emissions remaining after implementing Option 11)} \times 90\% \text{ (emissions remaining after implementing Option 12)} \times 90\% \text{ (emissions remaining after implementing Option 13)} \times 10\% \text{ (control efficiency)} = 0.01 \text{ lb/hd-yr}$$

$$\begin{aligned}\text{Options 9 through 14 Reduction} &= 0.01 \text{ lb/hd-yr (Option 9)} + 0.01 \text{ lb/hd-yr (Option 10)} \\ &+ 0.01 \text{ lb/hd-yr (Option 11)} + 0.01 \text{ lb/hd-yr (Option 12)} + 0.01 \text{ lb/hd-yr (Option 13)} + \\ &0.01 \text{ lb/hd-yr (Option 14)} = 0.06 \text{ lb/hd-yr}\end{aligned}$$

This is out of an emission factor of 21.0 lb/hd-yr.

$$\text{The percent reductions} = 0.06 \text{ lb/hd-yr} \div 21.0 \text{ lb/hd-yr} = 0.3\%$$

## 6. SOLID MANURE/SEPARATED SOLIDS PRACTICES

### Options 15 and 16: Cover piles outside the pens

These measures are intended to minimize moisture and anaerobic digestion due to wet conditions. There is no data regarding the amount of emissions from the manure storage piles, therefore staff conservatively estimated the separated solids and the manure piles emit approximately the same amount of VOC. Since there is little data regarding reductions staff assumed a default reduction of 10% for each mitigation measure. The reduction per measure is:

Option 16 Reductions =  $0.2 \text{ lb/hd-yr (piles)} \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 10\% = 0.02 \text{ lb/hd-yr reductions.}$

Option 17 Reductions =  $0.2 \text{ lb/hd-yr (piles)} \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 10\% = 0.02 \text{ lb/hd-yr reductions.}$

Option 16 and 17 Reductions =  $0.02 \text{ lb/hd-yr} + 0.02 \text{ lb/hd-yr} = 0.04 \text{ lb/hd-yr}$

This is out of an emission factor of 21.0 lb/hd-yr.

The percent reductions =  $0.04 \text{ lb/hd-yr} \div 21.0 \text{ lb/hd-yr} = 0.2\%$

## 7. LIQUID MANURE PRACTICES

### Option 17: All of the lagoon control options

AEM, 3/03, Vol 69, pg 1710-1720, indicates a 80-93% decrease in emissions from swine phototrophic lagoons; ILOC, 1995, pg 80-85, DiSpirito, found the same in swine lagoons; and JFB, 70:39-44, Hiraishi, found the same in sewage wastewater lagoons. The loading rate contributing to a phototrophic are typically found in lagoons utilizing a solid separator, NRCS guidelines for anaerobic lagoon design, and microaerobic nutrient management. However, these studies were for swine and not cattle. Based on AP42 by EPA, swine emit 63.5% of the volatile solids that cattle do. Therefore, in order to be conservative, staff assumed that cattle lagoons are 63.5% as efficient as swine lagoons ( $63.5\% \times 80\% = 50\%$ ). The baseline is 2.3 lb/hr/yr, however there are fewer emissions due to the use of the NRC feed guidelines. The reduction per measure is:

Option 17 Reductions =  $2.6 \text{ lb/hd-yr} \times 90\% \text{ (emissions remaining after implementing Option 1)} \times 50\% \text{ (control efficiency)} = 1.17 \text{ lb/hd-yr}$

This is out of a total emission factor of 21.0 lb/hd-yr.

The percent reductions =  $1.17 \text{ lb/hd-yr} \div 21.0 \text{ lb/hd-yr} = 6\%$ .

## 8. LAND APPLICATION PRACTICES

### Option 18 & 19: All methods for crop application.

These practices are intended to rapidly land incorporate the manure or waste water. The soil is expected to act as a biofilter since it is an organic media with significant microbial populations and airflow. Research suggests biofilters range in efficiency from 10% to 90% depending on how they are maintained. Conservatively staff assumed 50% control. The baseline emissions from crop application are 4.6 lb/hd-yr. The reduction per measure is:

Options 18 & 19 Reductions =  $4.6 \text{ lb/hd/year} \times 90\%$  (emissions remaining after implementing Option 1)  $\times 50\%$  (control efficiency) = 2.07 lb/hd-yr

This is out of a total emission factor of 21.0 lb/hd-yr.

The percent reductions =  $2.07 \text{ lb/hd-yr} \div 21.0 \text{ lb/hd-yr} = 10\%$ .

## 9. TOTAL REDUCTIONS

The total percent reductions can be calculated by summing the percent reductions for each mitigation measure above.

Total Reductions = 36%

As shown in the analysis above, the least costly mitigation measures and the most likely to be selected by facilities, achieves a significant amount of emission reductions, far greater than the 25% reductions required by Rule 4570. Since, Rule 4570 meets BARCT, and since BARCT is more stringent than RACT, then Rule 4570 also meets the definition of RACT.

## 5 CONCLUSION AND FUTURE PLANS

In determining whether District Rule 4570 meets RACT, the analysis has considered federal rules that cover large CAFs as well as rules in other California air districts. It can be concluded that District Rule 4570 exceeds RACT for the following reasons:

- There are no federal rules that apply to this category; therefore federal rules (CTG, NSPS, NESHAP) do not infer RACT for large CAFs.
- No rule has been approved into the California SIP for this source category, so there is no precedent that outlines RACT.
- SB 700 required California air districts with certain non-attainment status to implement BARCT. District Rule 4570 was designed to satisfy SB 700 and as a consequence, implements BARCT for large CAFs within the Valley. BARCT is a level of control that is considered more stringent than RACT.

- The mitigation measures outlined in Rule 4570 have been required as Best Available Control Technology (BACT) for new and modifying sources that trigger the BACT threshold.
- The Rule achieves a significant level of control even if the least costly measures are selected by the source.
- Rule 4570 requires mitigation measures for all large Confined Animal Facilities and for all major sources of emissions from a facility.
- A comparison of other California air district rules to District Rule 4570 shows that Rule 4570 is as stringent as rules in some air districts and is more stringent than rules in certain other air districts. No California air district rule is overall more stringent than District Rule 4570 for this source category.

Although District Rule 4570 is more stringent than RACT for large CAFs, District staff is pursuing additional emission reductions from CAFs in an upcoming rule project. Reducing VOC emissions from CAFs is a strategic control measure in the District's ozone attainment plan. The amendments to Rule 4570 will seek to obtain as much reduction of volatile organic compounds (VOCs) from CAFs as expeditiously practicable, technologically feasible, and economically reasonable, as determined by the District's Governing Board. The District's attainment plan anticipates an additional 30% reduction in VOCs by 2014 as a result of the rule amendments. These additional controls will effectively move Rule 4570 even further beyond RACT in terms of applicability and stringency.

## Rule 4601 – Architectural Coatings

### Emissions Inventory

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	9.1	9.4	9.6	9.7	10.2	10.5	10.9	11.2

(Source: District 2007 Ozone Plan)

### District Rule 4601 Description

This rule is applicable to any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating, or who manufactures any architectural coating for use within the District. District Rule 4601 specifies VOC coating limits from the state's (ARB's) 2000 Suggested Control Measure (SCM).

### How does District Rule 4601 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this source category.

### How does District Rule 4601 compare to rules in other air districts?

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4601 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1113, as amended July 2007

- Bay Area AQMD Regulation 8 Rule 3, as amended November 2001
- Ventura County APCD Rule 74.2 , as amended November 2001
- Sacramento Metro AQMD Rule 442, as amended May 2001

**A. South Coast AQMD Rule 1113**

SCAQMD has introduced new coating limits that are more stringent than the state's 2000 SCM. As a result, coatings that meet these new limits have been introduced in the South Coast area beginning in 2005. The new limits were phased-in over three years, with the final phase effective in July 2008.

District Rule 4601 is undergoing rule development process to incorporate South Coast limits for architectural coatings. Amendments are expected to be adopted in the fourth quarter of 2009.

**B. Bay Area AQMD Regulation 8 Rule 3; Ventura County APCD Rule 74.2, Sacramento Metropolitan AQMD Rule 442**

These air districts adopted ARB's 2000 SCM for architectural coatings. Rule 4601 used the same SCM as a template and, therefore, is currently at the same level of stringency as these air district rules. District Rule 4601 is undergoing rule development process to incorporate South Coast's limits for this source category. Rule 4601 amendments are expected to be adopted in the fourth quarter of 2009.

**Conclusion**

After careful evaluation of prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4601 satisfies RACT for architectural coatings.

## Rule 4603 – Surface Coating of Metal Parts and Products

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	0.57	0.60	0.66	0.68	0.76	0.81	0.86	0.88

(Source: District 2007 Ozone Plan)

### District Rule 4603 Description

District Rule 4603, recently amended on October 16, 2008, controls VOC emissions from miscellaneous metal part and products, including large appliances and metal furniture. The rule also controls emissions organic solvent cleaning, storage and disposal of solvents, and waste solvent materials associated with such coating operations. Rule 4603 establishes VOC content limits for coatings used in the manufacture and fabrication of metal parts and products as well as separate VOC limits for coatings used in large appliances and metal furniture. Except for large appliances or metal furniture, the general VOC limits for baked coatings and for air-dried coatings is 275 grams per liter and 340 grams/liter, respectively. Except for large appliances or metal furniture coating operations, the VOC limits for specialty coatings (except for) ranging from 360 grams/liter to 880 grams/liter for baked coatings and 420 to 880 for air-dried coatings, depending on the category of coating. Specialty coating category includes camouflage, extreme performance, heat resistant, high gloss, high performance architectural, high temperature, metallic topcoat, pretreatment primer, silicone release, solar absorbent, and solid film lubricant. For large appliances or metal furniture coating operations the coating VOC limits range from 275 grams/liter to 420 grams/liter depending on the type of coating and whether baked or air-dried. The VOC content limit for organic solvent cleaning materials is 25 grams/liter.

In lieu of using compliant coatings and solvents, District Rule 4603 allows the use of an APCO-approved VOC emission control system with an overall capture and control efficiency of at least 90 percent by weight. Also, the rule includes coating application methods, work practice standards, recordkeeping, and test methods.

District Rule 4603 exempts some source operations from certain requirements of the rule. It exempts facilities use a total of 55 gallons or less of non-compliant coatings per rolling consecutive 365-day period. Also exempt are sources that are regulated by other District's coating rules such as Rule 4661 (Organic Solvents), Rule 4602 (Motor vehicle and Mobile Equipment Coating Operations), Rule 4612 (Motor Vehicle and Mobile Equipment Operations Phase II), and Rule 4605 (Aerospace Assembly and Component Manufacturing Operations) Rule 4604 (Can and Coil Coating Operations). Touch-up and repair, polyester resin operations and the application of polyester resin to metal parts and products are exempt from District 4603. Some solvent cleaning



operations are also exempt (e.g., cleaning solar cells, lasers, high precision optics, laboratory tests, analyses or bench scale/research projects, paper-based gasket, etc.).

### **How does District Rule 4603 compare with federal rules and regulations?**

#### **A. EPA – Control Technique Guidelines (CTG)**

##### *1. CTG for Large Appliance Coatings (EPA 453/R-07-004), September 2007*

The 2007 CTG for large appliance coatings mentioned that EPA published in December 1977 a CTG for this same category, entitled Control of Volatile Organic Emissions from Existing Stationary Sources, Volume V: Surface Coating of Large Appliances OC Emissions (EPA-450/2-77-034). The 1977 CTG coating VOC limit is 2.8 lb/gallon for prime, single or topcoat application area, flashoff area and oven. The 2007 CTG limits for general, one component coating of 2.3 lb/gallon (air-dried or baked) is more stringent than the 1977 CTG VOC limit of 2.8 lb/gal. Also, the 1977 CTG specified only three coating categories whereas 2007 CTG has eight different categories. For this reason, District staff placed more emphasis in evaluating the more current emission standards of the 2007 CTG as RACT instead of the 1977 CTG.

The 2007 CTG applies to large appliance parts and products coating operations whose VOC emissions, before consideration of controls, are equal to or greater than 15 lb/day. The CTG allows an alternative applicability trigger level of 3 tons of VOC per 12-month rolling period. The CTG coatings VOC content limits range from 275 grams/liter (2.3 pounds/gallon) to 420 grams/liter (3.5 pounds/gallon) of coating, less water and exempt compounds, as applied, depending on the type of coating and whether air-dried or baked. In lieu of complying with the VOC coatings limits, an operator may install and operate a VOC emission control system that has an overall capture and control efficiency of at least 90 percent, by weight.

The CTG establish work practice standards to reduce VOC emissions. The standards include: storing all VOC coatings, thinners, and cleaning materials in closed containers, minimizing spills of VOC-containing coatings, thinners, cleaning spills immediately, conveying VOC-containing materials in closed containers or pipes, closing mixing vessels which contain VOC coatings and other materials except when specifically in use, and minimizing emissions of VOC during cleaning of storage, mixing, and conveying equipment.

The CTG exempts stencil coatings, safety-indicating coatings, solid-film lubricants, electric-insulating and thermal-conducting coatings, touch-up and repair coatings, and coating application utilizing hand-held aerosols.

## 2. CTG for Metal Furniture Coatings (EPA 453/R-07-005)

The CTG applies to metal furniture coating operations. The applicability VOC emission threshold, coating VOC limits, VOC emission control system control efficiency, and work practice standards, and exemptions are identical to the requirements discussed above for the CTG on large parts and products. Therefore, the CTG does not apply to these refinishing facilities. Based on the above discussion, District staff deems that District Rule 4606 satisfies Reasonably Available Control Technology (RACT).

## 3. CTG for Surface Coating of Miscellaneous Metal Parts and Products (EPA-450/2-78-015)

The CTG applies to surface coating of miscellaneous metal parts and products. The coating VOC limits is 3.5 lb/gallon for air or forced air-dried and 4.3 lb/gallon for clear coat. Nothing is mentioned about the VOC limit for baked coatings as well for specialty coatings. The CTG allows the use of a VOC control system with an efficiency of 90% in lieu of using compliant coatings. In addition, the CTG included discussions on different coating application equipment spray, electrodeposition, electrostatic, dip coating, etc. However, unlike the CTGs for large appliance and metal furniture coating operations, the miscellaneous parts and products CTG does not specify any applicability VOC emission threshold and any work practice standards.

The coatings VOC limits in CTG EPA-450/2-78-015 for miscellaneous parts and products of 3.5 lb/gallon for air or forced air-dried and 4.3 lb/gallon for clear coat are less stringent than District Rule 4603 VOC limit of 2.8 for general coating, air-dried. Rule 4603 prohibits the use of organic solvents for cleaning operations that exceed 25 grams per liter of material, but the CTG does not have any VOC limits for solvent cleaning operations.

## 4. CTG for Miscellaneous Metal and Plastic Parts Coatings (EPA-453/R-08-003)

The CTG applies to each miscellaneous metal products and miscellaneous plastic parts coating units at a facility where the total actual VOC emissions from all miscellaneous metal product and plastic parts surface coating operations, including related cleaning activities, at that facility are equal to or exceed 6.8 kg/day (15 lb/day), or an equivalent level of 2.7 tons per 12-month rolling period, before consideration of controls. EPA does not recommend the CTG's control approaches for facilities that emit below this level because of the very low emissions reductions that can be achieved.

For comparison with Rule 4603 (Surface Coating of Metal Parts and Products), only the CTG requirements that pertains to coating operations associated with miscellaneous metal parts and products will be discussed in this RACT analysis. For miscellaneous metal parts and products coating operations, the CTG coatings VOC content limits range from 2.3 pounds/gallon to 6.2 pounds/gallon) of coating, excluding water and exempt compounds, as applied, depending on the type of coating and whether air-dried or baked. As an option, the CTG allows the coatings VOC limits to be expressed in

terms of mass of VOC per volume of coating solids, as applied, for facilities that use a combination of low-VOC coatings and add-on control equipment on a coating unit. Using an assumed VOC density of 7.36 pounds per gallon, the equivalent limits in terms of mass of VOC per volume of solids, as applied, ranged from 3.35 pounds per gallon solids to 38 pounds per gallon solids, depending on the type of coating and whether air-dried or baked.

The CTG also allows a facility to use add-on control equipment with an overall control efficiency of 90 percent install and operate a VOC emission control system that has an overall capture and control efficiency of at least 90 percent in lieu of using low-VOC coatings and specified application methods.

The CTG VOC limits and application methods do not apply to aerosol coating products or powder coatings. Except for work practice standards, CTG VOC limits do not apply to stencil coatings, safety-indicating coatings, solid-film lubricants; and electric-insulating and thermal-conducting coatings.

The CTG included discussions on different coating application equipment such as air spray system (conventional, airless, air-assisted airless, electrostatic, HVLP, and zinc-arc), dip coating, powder coatings, flow coating, roll coating, electrocoating, and autophoretic.

The CTG establish work practice standards for coating-related activities to reduce VOC emissions. The standards include: store all VOC-containing coatings, thinners, and coating-related waste materials in closed containers; ensure that mixing and storage containers used for VOC-containing coatings, thinners, and coating-related waste materials are kept closed at all times except when depositing or removing these materials; minimizing spills of VOC-containing coatings, thinners, and coating-related waste materials; convey VOC-containing coatings, thinners, and coating-related waste materials from one location to another in closed containers or pipes.

The CTG does not specify any VOC limits for solvent cleaning operations other than work practice standards. The work practice standards for cleaning materials to reduce VOC emissions. The standards include: store all VOC-containing cleaning materials and used shop towels in closed containers; (2) ensure storage containers used for VOC-containing cleaning materials are kept closed at all times except when depositing or removing these materials; minimizing spills of VOC-containing cleaning materials; convey VOC-containing cleaning materials from one location to another in closed containers or pipes; and minimize VOC emissions from cleaning application, storage, mixing, and conveying equipment by ensuring that equipment cleaning performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

Rule 4603 general coating limits are: Air-dried - 275 grams per liter (2.3 pounds per gallon) of coating, less water and exempt compounds, as applied. Baked – 340 grams per liter (2.8 pounds per gallon) of coating, less water and exempt compounds, as

applied. The specialty coating limits for baked range from 880 grams per liter (7.3 pounds per gallon) to 360 grams per liter (3.0 pounds per gallon) of coating, less water and exempt compound, as applied, depending on the type of specialty coating; and for air-dried the limits range from 880 grams per liter (7.3 pounds per gallon) to 420 grams per liter (3.5 pounds per gallon) of coating less water and exempt compound, as applied, depending on the type of specialty coating. Coatings that are not specified in the table of VOC limits for specialty coatings are defaulted to the general coating category as specified above.

In comparison with the Rule 4603, the CTG limits are less stringent than Rule 4603 general coating limits (baked – 2.8 pounds per gallon; air-dried – 2.3 pounds per gallon) for the following coating types: electric-insulating varnish - 3.5 pounds per gallon (baked or air dried) ; etching filler - 3.5 pounds per gallon (baked and air dried); mold seal - 3.5 pounds per gallon (baked or air dried); pan backing - 3.5 pounds per gallon (baked or air dried) ; prefabricated architectural multi-component – 3.5 pounds per gallon (air-dried); prefabricated architectural one-component – 3.5 pounds per gallon (air-dried); pretreatment coating – 3.5 pounds per gallon (baked and air dried); vacuum-metalizing – 3.5 pounds per gallon (baked or air-dried). In addition, the CTG limits for baked camouflage coating and for metallic coating of 3.5 pounds per gallon is less stringent than Rule 4603 limit of 3.0 pounds per gallon. The CTG limit for baked extreme performance coating of 3.0 pounds per gallon is slightly stringent than Rule 4603 limit of 3.5 pounds per gallon. Repair and touch-up coating is exempt in Rule 4603 but the CTG has a VOC limit of 3.5 pounds per gallon (air-dried) and 3.0 pounds per gallon (baked).

In response to April 1, 2009 EPA comments that the 2008 CTG for Miscellaneous Metal and Plastic Coatings is more stringent than Rule 4603 (VOC limits for baked extreme performance, repair and touch-up coatings, and work practices for miscellaneous parts and products), District staff believes that Rule 4603, overall, is as stringent as the CTG for the following reasons:

- Rule 4603 only exempts touch-up and repair coating, but the CTG has more exempt coatings (i.e., stencil coatings, safety-indicating coatings, solid film lubricants, electric-insulating and thermal-conducting coatings, powder coatings, magnetic data storage disk coatings, plastic extruded onto metal parts to form a coating, and aerosol coatings. Except for powder coatings and aerosol coating exemption, the CTG provides no explanation why such coatings have been exempted. District staff believes that the potential VOC emissions from the CTG's numerous exempt coating categories as mentioned above would be greater than the emissions from just one exempt touch-up and repair coating category. It is important to mention that District Compliance staff's field inspections show that, for touch and repair, operators generally use the same VOC-compliant coatings that are being applied during the fabrication process because of ease of color matching and for economic reason that they do not have to buy a separate coating exclusively for touch-up and repair.

- Although the CTG limit of 3.0 lb/gal is slightly lower than Rule 4603 limit of 3.5 lb/gal for baked extreme performance coating, it is important to mention that the CTG has higher limits for 10 coating categories compared to a higher limit for only one coating in Rule 4603 as discussed above. District staff believes that the potential emissions from the CTG higher limits for 10 coatings would be greater than the emissions from Rule 4603 higher limit for only one coating category.
- Rule 4603 has work practice standards only for large appliances and metal furniture coating operations similar to the CTG but none for miscellaneous metal parts and products. The CTG only recommends work practice standards for cleaning materials but no specific VOC limit because EPA stated that they have no information available regarding current VOC content to determine RACT for cleaning materials. Although Rule 4603 does not have work practice standards for miscellaneous metal parts and products coatings, District staff believes that Rule 4603, overall, is equivalent in stringency because the rule prohibits the use organic solvent cleaning materials that contain more than 25 grams VOC per liter, as well as compliance with certain work practice standards for which the CTG have specific no requirements.

#### 5. *EPA 453/R-07-004 and EPA 453/R-07-005*

District Rule 4603 coatings VOC limits for large appliances and metal furniture coatings VOC limits, which range from 275 grams/liter to 420 grams/liter depending on the type of coating and whether baked or air-dried, are exactly the same as the limits specified by the CTGs. Unlike the CTGs for large appliances or metal furniture coating operations, District Rule 4603 does not exempt stencil coatings, safety-indicating coatings, solid-film lubricants, electric-insulating and thermal-conducting coatings. The work practice standards for large appliances or metal furniture coating operations are identical to the CTGs. Unlike the CTG which does not have any VOC limits for solvent cleaning operations, Rule 4603 prohibits the use of organic solvents for cleaning operations that exceed 25 grams per liter of material. As an alternative to complying with the solvent cleaning VOC limit, Rule 4603 allows the use of add-on emission control system that an overall capture and control efficiency of 90 percent, by weight.

Based on the discussion above, District staff deems District Rule 4603 overall is as stringent as the CTGs and satisfies RACT.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

*ACT for Industrial Cleaning Solvents (EPA-453-94-015), February 1994*

This ACT contained detailed discussion on solvent cleaning activities (i.e., dipping, flushing, purging, spraying, and wiping) and factors that affect emissions. However, the ACT does not specify any solvent VOC limit or emission standards. Therefore, it does

not serve any meaningful purpose for RACT determination of organic solvent cleaning activities.

In comparison, District Rule 4603 requires the use of cleaning solvents with a VOC content of no more than 25 grams/liter. As an alternative to using compliant cleaning solvents, an operator may operate an APCO-approved VOC emission control system that has an overall capture and control efficiency of 90%. In addition, District Rule 4603 also specifies allowable cleaning methods such as wipe cleaning, non-atomized solvent flow, and solvent flushing. The rule prohibits atomization of solvent into open air unless it is vented to an APCO-approved VOC emission control system, and also prohibits use of VOC containing materials to clean spray equipment unless an enclosed system is used. A spray equipment cleaning method other than an enclosed system may be used provided it is proven to be equally as an enclosed effective in controlling emissions. Based on the discussion above, District staff deems District Rule 4603 satisfies RACT.

### **C. Standards of Performance for New Stationary Sources (NSPS)**

#### **1. 40 CFR 60 Subpart EE (Surface Coating of Metal Furniture)**

This NSPS applies to metal furniture coating operation facility that commences construction, modification, or reconstruction after November 28, 1980. Facilities using less than 3,842 liters of coating, as applied, per year are exempt. The NSPS prohibits the discharge into the atmosphere of VOC emissions from coating operations in excess of 0.90 kg/liter (900 grams/liter) of coating solids applied. In lieu of using compliant coatings, a VOC capture and control system may be used provided the performance monitoring requirements specified in the NSPS are met. The NSPS specifies coating application methods and corresponding transfer efficiencies (air atomized spray - 0.25; airless spray - 0.25; manual electrostatic spray - 0.60; nonrotational automatic electrostatic spray - 0.70; rotating head electrostatic spray manual and automatic - 0.80%; dip and flow coating - 0.90; electrodeposition - 0.95). The NSPS details the methodology and mathematical equations for calculating the VOC emissions using the information VOC content of the coatings and the application method (with the corresponding transfer efficiency) to determine compliance with the 0.90 kg/liter limit.

#### **2. 40 CFR 60 Subpart SS (Industrial Surface Coating of Large Appliances)**

This NSPS applies to large appliance surface coating facility that commences construction, modification, or reconstruction after December 24, 1980. The NSPS prohibits the discharge into the atmosphere of VOC emissions from coating operations in excess of 0.90 kg/liter of coating solids applied. In lieu of using compliant coatings, a VOC capture and control system may be used provided the performance monitoring requirements specified in the NSPS are met. The NSPS specifies coating application methods and corresponding transfer efficiencies (air atomized spray - 0.40; airless spray - 0.45; manual electrostatic spray - 0.60; nonrotational automatic electrostatic spray - 0.85; rotating head automatic electrostatic spray - 0.90; dip and flow coating - 0.85; electrodeposition - 0.95). The NSPS details the methodology and mathematical

equations for calculating the VOC emissions using the information VOC content of the coatings and the application method (with the corresponding transfer efficiency) to determine compliance with the 0.90 kg/liter limit.

District Rule 4603 coatings VOC limits for large appliances and metal furniture coatings VOC limits, which range from 275 grams/liter (2.3 lb/gallon) to 420 grams/liter (3.5 lb/gallon) of coating, applied, depending on the type of coating and whether baked or air-dried, are more stringent than the NSPS VOC emission limit of 0.90 kg/liter of coating solids applied (equivalent to 3.7 lb/gallon of coating, assuming an average solvent solids density of 10 lb/gallon and an average solids solvent density of 7.34 lb/gallon).

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate that are issued to affected sources. The three NESHAPs that apply to miscellaneous metal parts and products, large appliances, and metal furniture coating operations are briefly discussed below.

##### *1. 40 CFR Part 63 Subpart M (NESHAP for Surface Coating of Miscellaneous Metal Parts and Products)*

This NESHAP applies to new, reconstructed, or existing affected source that uses 946 liters (250 gallons) per year or more of coatings that contain hazardous air pollutants (HAPs) in surface coating of miscellaneous metal parts and products defined in the NESHAP, and that is a major source, located at a major source, or a part of a major source. A major source of HAP emissions is a stationary source that emits or has the potential to emit any single HAP at a rate of 9.07 megagrams (10 tons) or more per year, or any combination of HAP at a rate of 22.68 megagrams (25 tons) or more per year. The NESHAP include provisions for complying with the applicable emission limits, work practice standards, recordkeeping and reporting requirements. The NESHAP also contains exemptions for certain types of surface coating operations. Work practice standards are also specified by the NESHAP. The standards include storing all organic containing materials in closed containers, minimizing spills of all HAP materials, conveying HAP materials from one location to another in closed containers or pipes, closing mixing vessels except when adding, removing, or mixing the contents; and minimizing emissions during cleaning of storage, mixing, and conveying equipment.

It is important to mention that the NESHAP HAP emission limits which are expressed in terms of mass (kg) of HAP per volume (liter) of coating solids are not directly

comparable to the coatings VOC limits which are expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4606 VOC limits.

2. *40 CFR Part 63 Subpart NNNN (NESHAP for Surface Coating of Large Appliances)*

This NESHAP applies to each new, reconstructed, and existing large appliance parts and products coating facility that is a major source of hazardous air pollutants (HAPs) that emits or has the potential to emit a single HAP of 9.07 megagrams (10 tons) per year, or any combination of HAPs of 22.68 megagrams (25 tons) per year. It applies to a new affected source that commences construction after July 23, 2002 and the construction is of a completely new large appliance surface coating facility where previously no large appliance surface coating facility had existed. The NESHAP include provisions for complying with the applicable emission limits, work practice standards, and recordkeeping and reporting requirements. The NESHAP also contains exemptions for certain types of surface coating operations. Work practice standards are also specified by the NESHAP. The standards include storing all organic containing materials in closed containers, minimizing spills of all HAP materials, conveying HAP materials from one location to another in closed containers or pipes, closing mixing vessels except when adding, removing, or mixing the contents; and minimizing emissions during cleaning of storage, mixing, and conveying equipment.

It is important to mention that the NESHAP HAP emission limits which are expressed in terms of mass (kg) of HAP per volume (liter) of coating solids are not directly comparable to the coatings VOC limits which are expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4606 VOC limits.

3. *40 CFR Part 63 Subpart RRRR (NESHAP for Surface Coating of Metal Furniture)*

This NESHAP applies to each new, reconstructed, and existing metal furniture coating facility that is a major source, is located at a major source, or is a part of a major source of emissions of HAPs. A major source of HAP emissions is any stationary source or group of stationary source located within a contiguous area and under common control that emits or has the potential to emit a single HAP of 9.07 megagrams (10 tons) per year, or any combination of HAPs of 22.68 megagrams (25 tons) per year. An affected source is a new affected source if it commenced its construction after April 24, 2002, and the construction is of a completely new metal furniture coating operation facility where previously no metal furniture surface coating facility existed.



The NESHAP include provisions for complying with the applicable emission limits, work practice standards, and recordkeeping and reporting requirements. The NESHAP also contains exemptions for certain types of surface coating operations. Work practice standards are also specified by the NESHAP. The standards include storing all organic containing materials in closed containers, minimizing spills of all HAP materials, conveying HAP materials from one location to another in closed containers or pipes, closing mixing vessels except when adding, removing, or mixing the contents; and minimizing emissions during cleaning of storage, mixing, and conveying equipment.

It is important to mention that the NESHAP HAP emission limits which are expressed in terms of mass (kg) of HAP per volume (liter) of coating solids are not directly comparable to the coatings VOC limits which are expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4606 VOC limits.

### **How does District Rule 4603 compare to rules in other air districts?**

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4601 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1136
- South Coast AQMD Rule 1107 (Coating of Metal Parts and Products) amended January 6, 2006
- BAAQMD Regulation 8 Rule 19 (Surface Preparation and Coating of Miscellaneous Metal Parts and Products) amended October 16, 2002
- BAAQMD Regulation 8, Rule 14 (Surface Preparation and Coating of Large Appliances and Metal Furniture) amended October 16, 2002
- Sacramento Metropolitan Air Quality Management District (SMQMD) Rule 451 (Surface Coating of Miscellaneous Metal Parts and Products) amended October 10, 1997
- Ventura County Air Pollution Control District (VCPCD) Rule 74.12 (Surface Coating of Metal Parts and Products) amended April 8, 2008

#### **A. SCAQMD Rule 1136**

SCAQMD Rule 1136 applies to all metal coating operations except those performed on aerospace assembly, magnet wire, marine craft, vehicle, metal container, and coil coating operations. It also does not apply to the coating of architectural components at the structure site or at a temporary unimproved location designated exclusively for coating of structural components. SCAQMD Rule 1136 specifies the VOC limits for 22 categories of coatings. The VOC limits range from 275 to 420 grams/liter for coatings depending on the coating type and whether air-dried or baked.

The VOC limit for stripping any coating is 200 grams/liter or less. As an alternate compliance option to using compliant coatings, the rule allows operators to use approved air pollution control equipment with a collection efficiency of 90% and a control efficiency of 95% (or the output of the control device is no more than 5 ppmv VOC calculated as carbon without dilution). The rule includes coating application equipment requirements and a VOC limit for solvent cleaning and surface preparation pursuant to SCAQMD Rule 1171 (Solvent Cleaning Operations).

## **B. SCAQMD Rule 1107 (Coating of Metal Parts and Products)**

SCAQMD Rule 1107 exempts the following coatings or coating operations:

- Stencil, safety indicating, magnetic data storage disk, solid film lubricants, and electric-insulating and thermal-conducting coatings
- Coatings and cleaning solvents used in performance tests on coatings at paint manufacturing facilities.
- High performance architectural, vacuum-metalizing, or pretreatment coatings used at a facility which has a potential to emit a total of 10 tons or less per year, before consideration of controls.
- Aerosol coating products.
- Use of aggregate 55 gallons or less of essential public service coatings per year per facility.
- Use of aggregate 10 gallons or less of optical anti-reflective coatings per year per facility.
- Use of 66 gallons of electrocoatings per month per facility provided the VOC content does not exceed 450 grams/liter, less water and less exempt compounds as applied.
- Photoresist operations applying liquid photoresist coating used for photofabrication of metal substrates with a thickness not exceeding 0.060 inch provided the usgae does not exceed 10 gallons per year per facility.

District Rule 4603 coatings VOC limits are subdivided into two major categories (i.e., general coatings and specialty coatings). For general coatings, the VOC limits are 340 grams/liter for air-dried and 275 for baked. The specialty coatings are subdivided into eight types of coatings. In addition, District Rule 4603 has separate VOC limits for coatings used in metal furniture and large appliance coating operations versus coatings used for other metal parts and products coating operations. In contrast, SCAQMD Rule 1107 does not have a general coating VOC limits, but the rule specifies VOC limits for 22 coating types. All the specialty coatings VOC limits of District Rule 4603 for metal parts and products are as stringent as SCAQMD Rule 1107, except for extreme high gloss, extreme performance, metallic, and camouflage coatings. SCAQMD Rule 1107 VOC limits for extreme high gloss air-dried of 340 grams/liter is stringent than 420 grams/liter limit of District Rule 4603. However, SCAQMD Rule 1107 VOC limit for metallic coating and camouflage coating of 420 grams/liter baked is less stringent than District Rule 4603 limit of 360 grams/liter air dried. SCAQMD Rule 1107 coatings VOC limit for etching filler, vacuum-metalizing, mold seal, electric-insulating varnish, and pan backing coatings is 420 grams/liter is less stringent than District Rule 4603 coatings

limits of 275 grams/liter baked and 340 grams/liter air-dried (comparison is made using the general coatings limits since District Rule 4603 has no corresponding coating types). For large appliances and metal furniture coating operations, District Rule 4603 VOC limits are the as stringent as SCAQMD Rule 1175. SCAQMD Rule 1107 has a VOC limit of 420 grams/liter air-dried and 360 grams/liter baked for touch-up coatings and repair coatings. District Rule 4603, however, does not have a VOC limit because touch and repair are exempt from the rule requirements.

The solvents cleaning VOC limit of 25 grams/liter in District Rule 4603 is the same as the SCAQMD solvent cleaning limit for this source category which regulated under SCAQMD Rule 1171 (Solvent Cleaning Operations).

Although SCAQMD Rule 1107 has slight more stringent VOC limits for extreme high gloss and extreme performance coatings than District Rule 4603, there are some coating types where SCAQMD Rule 1107 has less stringent limits as discussed above. It important to mention SCAQMD Rule 1107 has more exemptions than District Rule 4603. Based on the above discussion District staff deems that overall District Rule 4603 is as stringent as SCAQMD Rule 1107.

### **C. BAAQMD Regulation 8 Rule 19 (Surface Preparation and Coating of Miscellaneous Metal Parts and Products)**

BAAQMD Regulation 8 Rule 19 applies to surface preparation and coating of miscellaneous parts and products. The VOC limits for general coatings are 340 grams/liter for air-dried and 275 for baked. For specialty coatings, the VOC limits range from 360 grams/liter to 420 grams/liter depending on the coating type and whether baked or air-dried. In lieu of using compliant coatings, BAAQMD Regulation 8 Rule 19 allows the use of an air pollution abatement equipment with an efficiency of at least 85% provided the emissions are reduced to a level that is at least equivalent to the emissions generated by using compliant coatings.

BAAQMD Regulation 8 Rule 19 specifies the requirements for spray application equipment such as HVLP, electrostatic spray, detailing gun, or other spray application equipment that achieves equivalent transfer efficiency. The solvent evaporative loss minimization provisions require closed containers for storage or disposal of materials used for solvent surface preparation and cleanup; prohibits use of organic solvents that have a VOC content in excess of 50 grams/liter for cleanup of spray equipment and paint lines unless a spray gun washer that complies with Regulation 8, Rule 16 as well is used, or the solvent is pressurized through spray equipment with atomizing air off or disposed from a small non-atomizing container, and collected and stored in a closed container until recycled or properly disposed. The surface preparation solvent limit is 50 grams/liter or the use of an approved emission control system with an overall abatement efficiency of at least 85%.

BAAQMD Regulation 8 Rule 19 exempts the following:

- Usage of any coating that does not meet the applicable coating VOC limits if such usage is less than 75.7 liters (20 gallons) in any one calendar year and provided the total amount of all noncompliant coatings used does not exceed 100 gallons in any calendar year.
- Application of adhesives; touch-up operations; metal containers and closures (drums, cans, lid, etc.) and metal coil; magnet wire for use in electrical machinery; metal furniture and large appliances (subject to Regulation 8, Rule 14); aircraft or aerospace vehicles; motor vehicles and mobile equipment; marine vessels and component parts; stationary structures and appurtenances which require architectural coatings except where bake coatings are required; stencil coatings, powder coatings provided the VOC emissions do not exceed that which is equivalent to the use of compliant coatings, solid film lubricants, chemical milling maskant, and coatings applied to printed board circuits, and other exemptions.
- Specialty coatings (high performance; pretreatment wash primer; silicon release, extreme performance, and high temperature) provided they meet the VOC limits which range from 550 to 780 grams/liter depending on the type of coating and provided the usage of such coatings does not exceed 3,785 liters (100 gallons) in any calendar year.
- Source operations using less than 20 gallons of coating in any calendar year is exempt from recordkeeping requirements.
- Certain spray application equipment are exempt but with specific conditions of use.

The coatings VOC limits of District Rule 4603 for metal parts and products are as stringent as the limits of BAAQMD Regulation 8, Rule 19. District Rule 4603 has VOC limit of 880 grams/liter for solid film lubricant, but BAAQMD Regulation 8, Rule 19 exempts such coating. In lieu of using compliant coatings District Rule 4603 allows the use of a VOC emission control system with an overall capture and control efficiency of 90%, which is more stringent than BAAQMD Regulation 8, Rule 19 requirement of 85% abatement efficiency.

BAAQMD Regulation 8, Rule 19 requirements on spray application equipment and work practice standards (solvent evaporative loss minimization) are as stringent as District Rule 4603. However, the surface preparation and solvent clean-up VOC limit of 25 grams/liter of District Rule 4603 is more stringent than the BAAQMD Regulation 8, Rule 19 limit of 50 grams/liter. With regard to exempt operations, District Rule 4603 has lesser exempt operations than BAAQMD regulation 8, Rule 19. Based on the above discussions, District staff deems that overall District Rule 4603 is more stringent than BAAQMD Regulation 8, Rule 19.

#### **D. BAAQMD Regulation 8, Rule 14 (Surface Preparation and Coating of Large Appliances and Metal Furniture)**

BAAQMD Regulation 8, Rule 14 applies to surface preparation and coating of large appliances and metal furniture. The VOC limits for general coatings (high gloss, heat resistant, metallic topcoat, pretreatment wash primer, and solar adsorbant) are 340

grams/liter for air-dried and 275 for baked. For specialty coatings, the VOC limits range from 360 grams/liter to 420 grams/liter depending on the coating type and whether baked or air-dried. In lieu of using compliant coatings, BAAQMD Regulation 8 Rule 19 allows the use of an air pollution abatement equipment with an efficiency of at least 85% provided the emissions are reduced to a level that is at least equivalent to the emissions generated by using compliant coatings.

BAAQMD Regulation 8 Rule 14 specifies the requirements for spray application equipment such as HVLP, electrostatic spray, flow coat, roller coat, dip coat, electrodeposition, and brush coat. The solvent evaporative loss minimization provisions require closed containers for storage or disposal of materials used for solvent surface preparation and cleanup; prohibits use of organic solvents that have a VOC content in excess of 50 grams/liter for cleanup of spray equipment and paint lines unless a spray gun washer that complies with Regulation 8, Rule 16 as well is used, or the solvent is pressurized through spray equipment with atomizing air off or disposed from a small non-atomizing container, and collected and stored in a closed container until recycled or properly disposed. The surface preparation solvent limit is 50 grams/liter or the use of an approved emission control system with an overall abatement efficiency of at least 85%.

BAAQMD Regulation 8 Rule 19 exempts the following:

- Use of any coating that does not meet the applicable coating VOC limits if such usage is less than 75.7 liters (20 gallons) in any one calendar year and provided the total amount of all noncompliant coatings used does not exceed 208.1 liters (55 gallons) in any calendar year.
- Touch coating operation; adhesives application; aerosol cans, powder coatings provided the VOC emissions do not exceed that which is equivalent to the use of compliant coatings.
- Surface preparation of electrical and electronic components; stripping of cured coatings, inks, and adhesives; research and development surface preparation; performance testing of adhesives, inks, and coatings; quality control and quality assurance testing.

The coatings VOC limits of District Rule 4603 for metal parts and products are as stringent as the limits of BAAQMD Regulation 8, Rule 14, except the baked metallic topcoat VOC limit of 420 grams/liter is slight more stringent than District Rule 4603 limit of 420 grams/liter. However, BAAQMD Regulation 8, Rule 14 general coating VOC limit for air dried coatings of 340 grams/liter is less stringent than District Rule 4603 VOC limit 275 grams/liter for air dried one component coating. In lieu of using compliant coatings District Rule 4603 allows the use of a VOC emission control system with an overall capture and control efficiency of 90%, which is more stringent than BAAQMD Regulation 8, Rule 14 requirement of 85% abatement efficiency.

BAAQMD Regulation 8, Rule 14 requirements on spray application equipment and work practice standards (solvent evaporative loss minimization) are as stringent as District Rule 4603. However, the surface preparation and solvent clean-up VOC limit of 25

grams/liter of District Rule 4603 is more stringent than the BAAQMD Regulation 8, Rule 19 limit of 50 grams/liter. With regard to exempt operations, District Rule 4603 has lesser exempt operations than BAAQMD Regulation 8, Rule 14. Based on the above discussions, District staff deems that overall District Rule 4603 is more stringent than BAAQMD Regulation 8, Rule 14.

**E. Sacramento Metropolitan Air Quality Management District (SMQMD) Rule 451 (Surface Coating of Miscellaneous Metal Parts and Products)**

SMAQMD Rule 451 applies to the coating of miscellaneous parts and products including removal (stripping), surface preparation and cleanup operations. The coatings VOC limits range from 340 to 420 grams/liter for air dried coatings and from 275 to 420 grams/liter for baked coatings, depending on the type of coatings. As an alternative to using compliant coatings, an APCO-approved air pollution control equipment which has an overall system efficiency of 85% may be used to comply with the rule. The VOC limit for strippers is 200 grams/liter. The rule includes requirements for coating application equipment (roll coater, dip coat, electrostatic spray, flow coat, HVPL, LVLP, hand application such as brush or roller, or any other method approved by the APCO and EPA. Surface preparation, cleanup, and storage requirements include using closed containers for disposal of cloth, paper, or sponges used for surface preparation cleanup and coating removal; closed containers for storing VOC-containing materials except when in use; use enclosed gun cleaner or use cleanup solvent with a VOC content that does not exceed 72 grams/liter; spray guns only may be soaked in solvent-based materials in a container not exceeding 5 gallons is tightly covered at all times except when accessing the container.

SMAQMD Rule 451 exempts the following:

- Use of any coating that does not meet the applicable coating VOC limits if such usage is less than 55 gallons per calendar year, per stationary source, except for complying with recordkeeping requirements.
- Use of any aluminum coating for window and door frames exceeding the specified VOC limit if the usage is less than 200 gallons per calendar year, per stationary source, except for complying with the recordkeeping requirements.
- Use of pretreatment wash primer that exceeds the specified VOC limit if the usage is less than 200 gallons per calendar year, per stationary source, except for complying with the recordkeeping requirements.
- Coating of prefabricated architectural components or structures not coated in a shop which are regulated by Rule 442 (Architectural Coatings).
- Coating of motor vehicles, excluding radiators, drive trains, differentials, and engine components which by Rule 459 (Automotive, Truck and heavy Equipment Refinishing Operations).
- Coating of aircraft or aerospace vehicles; cans, coils or magnetic wire; adhesives; magnetic data storage disc; safety indicating coatings; stencil coatings; conformal coatings (e.g., coating of electronic circuit boards or assembled components); and hand lettering.

The coatings VOC limits of SMAQMD Rule 451 are as stringent as District Rule 4603, except SMAQMD Rule 451 aluminum coating limit of 420 grams per liter for baked and air-dried coating, 420 grams/liter for baked metallic/iridescent, and baked non-skid 360 grams/liter are less stringent than District Rule 4603 general coatings limits of 275 grams/liter for baked and 340 grams/liter for air dried coatings and baked metallic coating limit of 360 grams/liter. In lieu of using compliant coatings, SCAQMD Rule 451 allows the use of an APCO-approved air pollution control equipment with an overall system efficiency of 85% compared to District Rule 4603 more stringent overall capture and control efficiency of 90%. SCAQMD Rule 551 solvent cleaning and surface preparation VOC limit of 72 grams/liter is less stringent than District Rule 4603 VOC limit of 25 grams/liter.

Unlike the exemptions in SMAQMD Rule 451, District Rule 4603 does not exempt aluminum coating for window and door frames exceeding the specified VOC limit if the usage is less than 200 gallons per calendar year; coatings used on magnetic data storage disc; safety indicating coatings; stencil coatings; conformal coatings (e.g., coating of electronic circuit boards or assembled components); and hand lettering. Based on the above discussion, District staff deems that District Rule 4603 overall is more stringent than SCAQMD Rule 451.

#### **F. Ventura County APCD Rule 74.12 (Surface Coating of Metal Parts and Products)**

VCPCD Rule 74.12 applies to surface coating of metal parts and products. The coatings VOC limits range from 275 to 420 grams/liter depending on the type of coating and whether the coating is air-dried or baked. As an alternative to using compliant coatings, an APCO-approved air pollution control equipment which has an overall system efficiency of 90% may be used to comply with the rule. VCPCD Rule 74.12 contains coating application equipment and solvent cleanup and surface preparation requirements, but the rule does not include any work practice standards. The VOC limit for substrate surface cleaning and spray equipment cleaning or cleanup is 25 grams/liter.

VCPCD Rule 74.12 exempts the following:

- If no complying coatings are available, total usage of non-complying coatings has not exceeded 55 gallons in any calendar year.
- Aircraft or aerospace vehicle coating operations; marine vessel exteriors; motor vehicle and mobile equipment; and aerosol coating products.
- Stationary source that emits less than 200 lb ROC (VOC) in every rolling period of 12 consecutive months from metal parts and products coating operations (emissions from aerosol products, cold cleaners and vapor degreasers should not be included in this determination).
- Surface preparation and cleanup requirements do not apply to metal parts and products coating operations if the total usage of non-complying substrate surface cleaners does not exceed 5 gallons per rolling 12-month period.

VCPACD Rule 74.12 coatings VOC limits of 275 grams per liter for air-dried for “all coatings” category, 360 grams/liter for baked extreme performance coating, and 420 grams/liter for air-dried and 275 grams/liter for baked pretreatment wash primer are slightly more stringent than District Rule 4603 limits of 340 grams/liter for air-dried general coatings, 420 grams/liter for baked extreme performance, and 420 grams/liter for both air-dried and baked pretreatment coating. However, District Rule 4603 coatings VOC limits of 340 grams/liter air-dried and 275 grams/liter baked for general coatings are more stringent than VCPACD Rule 74.12 limits of 420 grams/liter for air-dried or baked mold seal coating, 420 grams/liter for air-dried or baked pan backing coating, and 420 grams/liter for air-dried and baked vacuum metalizing coating. It is important to mention that since District Rule 4603 does include mold seal, pan backing, and vacuum metalizing coating categories, such coatings are subject to the “general coatings” VOC limits of District Rule 4603. District Rule 4603 includes work practice standards while VCPACD Rule 74.12 has none specified. In addition, District Rule 4603 has VOC limits for metal parts and products coating operations and separate limits for large appliances and metal furniture coating operations. Unlike District Rule 4603, VCAPCD Rule 74.12 exempts sources that emit less than 200 lb ROC (VOC) in every rolling period of 12 consecutive months from metal parts and products coating operations (emissions from aerosol products, cold cleaners and vapor degreasers should not be included in this determination). Based on the above discussion, District staff deems that overall District Rule 4603 is as stringent as VCAPCD Rule 74.12.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4603 satisfies RACT for metal parts and products, large appliance parts and products, and metal furniture coating operations. However, in order to incorporate the recent CTG requirements, as outlined in Table 4-3, the rule is on a schedule for amendment.



## Rule 4604 - Can and Coil Coating Operations

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4

(Source: District Ozone Plan)

### District Rule 4604 Description

District Rule 4604, recently amended on September 20, 2007, controls VOC emissions from can and coil coating operations, and from organic solvent cleaning, storage and disposal associated with can coating and coil coating operations.

The rule limits the VOC content of different coatings and allows an emission control device for those companies who use non-compliant coatings. Alternative emission control plans are also allowed under certain conditions. The emission control system or alternative emission control plan must reduce emissions to no more than the amount of VOCs that would have been emitted had rule-compliant coatings been used. The rule contains provisions for organic solvent cleaning, storage and disposal requirements, monitoring provisions, and recordkeeping.

There are a limited number of sources subject to Rule 4604 (less than ten). There are neither two-piece can manufacturers nor coil coating operations in the SJVAB. Except for the closed manufacturing site, the companies subject to this rule have year-round operations, although some of the equipment under permit is operated only during peak periods.

### How does District Rule 4604 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

*EPA-450/2-77-008 1977/05*

The CTG applies to surface coating of cans, coils, paper, fabrics, automobiles, and light-duty trucks operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

The table below identifies the CTG requirements and how Rule 4604 compares to those requirements.

Coating Type	CTG (lb/gal)	Rule 4604 (lb/gal)
Can Sheet basecoat	2.8	2.1
Can Interior Body	4.2	3.5
Can Side Seam	5.5	5.5
Can End Seal	3.7	0.2
Coil Prime and Topcoat	2.6	1.7

As shown in the table above, District Rule 4604 is as stringent or more stringent than all CTG limits.

### B. EPA - Alternative Control Technology (ACT)

There is no EPA ACT guidance document for can and coil coating operations.

### C. Standards of Performance for New Stationary Sources (NSPS)

1. *40 CFR 60 Subpart TT (Standards of Performance for Metal Coil Surface Coating)*

The table below identifies the NSPS requirements and how Rule 4604 compares to those requirements.

Coating Type	NSPS (kg/l)	4604 (kg/l)
Coil Surface – No Control Device	0.28 (monthly average)	0.20
Coil Surface – W/Control Device	0.14 (monthly average) or 90% VOC reduction	90% VOC reduction

As shown in the table above, District Rule 4604 is as stringent or more stringent than all NSPS limits.

2. *40 CFR 60 Subpart WW (Standards of Performance for Beverage Can Surface Coating Industry)*

The table below identifies the NSPS requirements and how Rule 4604 compares to those requirements.

Coating Type	NSPS (kg/l)	4604 (kg/l)
2-Piece can exterior base coat	0.29	0.25
2-Piece can clear base coat	0.46	0.25
2-Piece can overvarnish	0.46	0.25
2-Piece can inside spray	0.89	0.36

As shown in the table above, District Rule 4604 is as stringent or more stringent than all NSPS limits.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

1. *40 CFR 63 Subpart KKKK (National Emission Standards for HAPs: Surface Coating of Metal Cans)*

Per Section 63.3481, this Subpart does not apply since 40 CFR 63 Subpart SSSS (National Emission Standards for HAPs: Surface Coating of Metal Coil) applies to this emission source category.

2. *40 CFR 63 Subpart SSSS (National Emission Standards for HAPs: Surface Coating of Metal Coil)*

The requirements in this subpart are not directly comparable to the District Rule 4604 limit of 200 g/L of coil coating. The NESHAP HAP emission limits which are expressed in terms of % HAP, HAP emission concentration, and mass (kg) of HAP per mass (kg) of solids are not directly comparable to the coatings VOC limit which is expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4604 VOC limits.

**How does District Rule 4604 compare to rules in other air districts?**

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4604 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1125 - Metal Container, Closure, and Coil Coating Operations, amended March 7, 2008
- BAAQMD Regulation 8 Rule 11 - Metal Container, Closure and Coil Coating, as amended November 19, 1997

- Sacramento Metropolitan Air Quality Management District (SMQMD) Rule 452 (Can Coating), as amended September 25, 2008
- Ventura County Air Pollution Control District (VCPCD) - No rule for can or coil coating facilities.

**A. South Coast Air Quality Management District (SCAQMD) Rule 1125 - Metal Container, Closure, and Coil Coating Operations**

SCAQMD Rule 1125 applies to can and coil coating operations. The table below identifies where the rules differ in VOC requirements. Categories not discussed, such as solvents, means the two rules have the same requirement.

Category	South Coast (g/l)	SJ Valley (g/l)	More Stringent for Category
Exemption Throughput	1 gal/day	55 gal/year	SJ Valley
Necker Lubricants	100	Exempt	South Coast
Stripping of Cured Materials	25	Exempt	South Coast
Cleaning Solvents Lab/Research	25	Exempt	South Coast
2-Piece can interior spray	440	420	SJ Valley
End Seal Compound (Food/Beverage)	440	20	SJ Valley
End Seal Compound (Non-Food/Beverage)	0	20	South Coast
Inks	250 - 800	See Rule 4607 RACT Analysis	See Rule 4607 RACT Analysis

Due the central locality of the agriculture industry, the SJ Valley's can/coil coating facilities overwhelmingly manufacture food/beverage products compared to non-food/beverage products. As such, the SJ Valley's stringent rule limit of 20 g/l (versus the South Coast limit of 440 g/l) has a greater affect on VOC emissions compared to the insignificant categories where the South Coast is more stringent, such as the small/exempt operations and end seal compound for non-food/beverage. Overall SJVAPCD Rule 4604 is at least as stringent as SCAQMD Rule 1125.

**B. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 11 – (Metal Container, Closure and Coil Coating )**

BAAQMD Reg 8 Rule 11 applies to can and coil coating operations. The table below identifies where the rules differ in VOC requirements. Categories not discussed means the two rules have the same requirement.

Category	Bay Area (g/l)	SJ Valley (g/l)	More Stringent for Category
<b>Exemptions</b>			
Facilities Using < 55 gal/year	Not Exempt	Exempt	Bay Area
<b>Two Piece Can Coating</b>			
Exterior Sheet Base Coating	225	250	Bay Area
End Coating (Interior or Exterior)	250	420	Bay Area
Repair Coating	No Limit	750	SJ Valley
<b>Three Piece Can Coating</b>			
Overvarnish (Exterior or Interior)	250	225	SJ Valley
End Coating (Exterior or Interior)	250	225	SJ Valley
Repair Coating	No Limit	750	SJ Valley
<b>Drum Pails, Pails, and Lids</b>			
Sheet Base Coating	No Limit	225	SJ Valley
Overvarnish (Exterior or Interior)	No Limit	225	SJ Valley
Interior End Coating (New)	No Limit	420	SJ Valley
Interior End Coating (Reconditioned)	No Limit	510	SJ Valley
Exterior End Coating (New)	No Limit	340	SJ Valley
Exterior End Coating (Reconditioned)	No Limit	420	SJ Valley
Side Seam Coating	No Limit	660	SJ Valley
Inks	300	See Rule 4607 RACT Analysis	See Rule 4607 RACT Analysis
<b>Solvents</b>			
Surface Preparation	No Limit	25	SJ Valley
Repair and maintenance	No Limit	25	SJ Valley
Cleaning of Coating Application Equipment (except 3-piece can sheet coater)	No Limit	25	SJ Valley
Cleaning of 3-piece can sheet coater	No Limit	550	SJ Valley

As shown in the table above, the SJVAPCD rule contains an overwhelmingly amount of requirements that are more stringent than the Bay Area Rule. Also, potential reductions from two-piece can coating are non-existent since there are no two-piece can coating operations in the SJVAPCD. Overall SJVAPCD Rule 4604 is at least as stringent as BAAQMD Regulation 8 Rule 11.

### C. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 452 (Can Coating)

SMAQMD Rule 452 applies to can coating operations. The table below identifies where the rules differ in VOC requirements. Categories not discussed means the two rules have the same requirement.

Category	Sac Metro (g/l)	SJ Valley (g/l)	More Stringent for Category
<b>Exemptions</b>			
Facilities Using < 55 gal/year	Not Exempt	Exempt	Sac Metro
<b>Two Piece Can Coating</b>			
Exterior Body Spray	No Limit	420	SJ Valley
End Coating (Interior or Exterior)	250	420	Sac Metro
End Seal Compound (Non-Food)	0	20	Sac Metro
Repair Coating	No Limit	750	SJ Valley
<b>Three Piece Can Coating</b>			
Exterior Body Spray	No Limit	420	SJ Valley
End Coating (Exterior or Interior)	No Limit	250	SJ Valley
End Seal Compound (Non-Food)	0	20	Sac Metro
Repair Coating	No Limit	750	SJ Valley
<b>Coil</b>			
Prime and topcoat or single coat	225	200	SJ Valley
<b>Solvents</b>			
Surface Preparation	25 (starting 9/25/09)	25	SJ Valley
Repair and maintenance	25 (starting 9/25/09)	25	SJ Valley
Cleaning of Coating Application Equipment (except 3-piece can sheet coater)	25 (starting 9/25/09)	25	SJ Valley
Cleaning of 3-piece can sheet coater	25 (after 9/25/09)	550 (until 9/30/11) 250 (after 9/25/09)	Sac Metro
Cleaning side seam spray applicators	No Limits	25	SJ Valley

Not shown in the table above is a comparison for drum, pail, and lid coating categories. The SJVAPCD rule contains limits for drum, pail, and lid coating, whereas the SMAQMD rule does not. The SJVAPCD will assume that since SMAQMD rule has no

limits for this category, there are no facilities of this nature in the SMAQMD. As such, the two District rules will be considered equivalent for the drum, pail, and lid coating categories.

As shown in the table above, the SJVAPCD rule contains several requirements that are more stringent than the SMAQMD Rule. Also, potential reductions from two-piece can coating are non-existent since there are no two-piece can coating operations in the SJVAPCD. Overall SJVAPCD Rule 4604 is at least as stringent as SMAQMD Rule 452.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4604 satisfies RACT for can and coil coating operations.

## Rule 4605 – Aerospace Assembly and Component Coating Operations

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

(Source: District 2007 Ozone Plan)

### District Rule 4605 Description

District Rule 4605, recently amended on September 20, 2007, sets VOC content limits for coatings, adhesives, and other related VOC-containing materials for coating operations related to aerospace assemblies and components.

The flushing of jet or rocket engines using any solvent other than trichloroethylene is exempt. Aerospace assembly and component coating operations using less than four gallons per day of VOC-containing products are exempt as are other coatings or adhesives. Materials used in laboratories associated with research and development, quality control, or production testing are exempt from VOC content limits. There is also a limited exemption from application equipment standards. VOC emissions are 50% controlled compared to uncontrolled emissions.

### How does District Rule 4605 compare with federal rules and regulations?

#### A. *EPA-Control Technique Guidelines (CTG)*

1. The CTG EPA-453/R-97-004 1997/12 applies to *Surface Coating Operations at Aerospace Manufacturing and Rework Operations* located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

The table below identifies the CTG requirements and how Rule 4605 compares to those requirements.

Coating Type	CTG (g/L)	4605 (g/L)
Ablative	600	-
Adhesion Promoter	890	850
Adhesive Bonding Primers	850	805
Adhesive (Non-Structural)	360	250
Adhesive (Structural Autoclavable)	60	50
Adhesive (Structural Non-Autoclavable)	850	850
Antichafe	660	600
Bearing Coating	620	--



<b>Coating Type</b>	<b>CTG (g/L)</b>	<b>4605 (g/L)</b>
Caulking and Smoothing Compounds	850	--
Chemical Agent Resistant Coating	550	--
Conformal Coating	--	750
Dry Lubricative Material	880	675
Electric/Radiation Effect Coating	800	800
Electromagnetic Interference Coating	800	--
Fire-Resistant Coatings	800	650
Flight Test Coatings (Missiles or Single Use Target Craft)	420	420
Flight Test Coatings (Other)	840	600
Fuel Tank Coatings	720	420
High Temperature Coating	850	850
Impact Resistant Coating	--	420
Intermediate Release Coating	750	--
Lacquer	830	--
Maskants	1,020	250
Metalized Epoxy Coating	740	--
Mold Release	780	--
Optical Anti-Reflective Coating	750	700
Part Marking Coating	850	--
Pretreatment Coatings	780	780
Primer (Commercial Exterior Aerodynamic Structure)	650	350
Primer (General)	--	350
Primer (Compatible Substrate)	780	350
Primer (Cryogenic Flexible)	645	350
Primer (Flexible)	640	350
Primer (Elevated Temperature Skydrol Resistant Commercial)	740	350
Rain Erosion Resistant Coating	850	800
Rocket Motor Nozzle Coating	660	--
Scale Inhibitor	880	880
Screen Print Ink	840	--
Sealant (Extrudable/Rollable/Brushable)	280	600
Sealant (Fastener)	600	675
Sealant (Sprayable)	600	600
Silicone Insulation Material	850	--
Solid Film Lubricant (Fastener Mfr)	880	250
Solid Film Lubricant (Fastener Installation)	880	880
Solid Film Lubricant (Non-Fastener Mfr)	880	880
Space Vehicle Coatings (Electrostatic Discharge Protection)	--	800
Space Vehicle Coatings (Adhesives)	--	800
Space Vehicle Coatings (Other)	--	1,000
Specialized Function Coating	890	--
Temporary Protective Coating	320	250
Thermal Control Coating	800	--
Topcoat (General)	--	420
Topcoat (Barrier)	--	420
Topcoat (Clear)	720	520
Topcoat (Epoxy Polyamide)	660	--
Topcoat (Self Priming - Unicoat)	--	420
Wet Fastener Installation Coating	675	--
Wing Coating	850	750

Coating Type	CTG (g/L)	4605 (g/L)
Wire Coating (Electronic)	--	420
Wire Coating (Anti-Wicking)	--	420
Wire Coating (Pre-Bonding Etching)	--	420
Wire Coating (Phosphate Ester Resistant Ink)	--	925

As shown in the table above, District Rule 4605 is more stringent than the CTG limits for 34 categories, while the CTG is more stringent than District Rule 4605 in 19 categories. As such, District staff concludes that District Rule 4605 is at least as stringent overall than the CTG.

2. The CTG EPA-450/2-77-034 1977/12 applies to *Surface Coating of Large Appliances* operations located in marginal, moderate, serious or severe ozone nonattainment areas that have the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

Since this CTG applies to large appliance coating; therefore, it will not be compared to SJVAPCD Rule 4605 which covers aerospace coating.

3. The CTG EPA-450/2-77-022 1977/11 applies to *VOC Emissions from Solvent Metal Cleaning* operations located in marginal, moderate, serious or severe ozone nonattainment areas that have the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

This CTG applies to the use of the following degreasing equipment: cold cleaners, open top vapor degreasers, and conveyORIZED degreasers. Identified in the CTG are design and work practice standards for cold cleaners, open top vapor degreasers, and conveyORIZED degreasers, for example: cover the solvent tank, have a facility for waste solvent and draining cleaned parts, permanent labels on operating parts, close degreaser when not in use, drain parts until dripping ceases, no excessive splashing if solvent is sprayed. The CTG also identifies add-on controls such as refrigeration chillers and carbon control.

SJVACPD Rule 4605 identifies solvent VOC content limits or a control system with efficiencies of at least 90% capture and 95% control, and that would not allow more emissions than if compliant materials were utilized. The general solvent limit is 200 g/L; the coating stripper solvent limit is currently 300 g/L.

Since the CTG does not identify control requirements any more stringent than SJVACPD Rule 4605, District staff considers Rule 4605 at least as stringent as the CTG.

#### B. EPA - Alternative Control Technology (ACT)

There is no EPA ACT guidance document for aerospace coating operations.

C. *Standards of Performance for New Stationary Sources (NSPS)*

There is no NSPS guidance document for aerospace coating operations.

D. *National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)*

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

1. 40 CFR 63 Subpart GG (National Emission Standards for HAPs: Aerospace Manufacturing and Rework Facilities)

The requirements in this subpart are not directly comparable to the District Rule 4605 VOC limits. The NESHAP HAP emission limits which are expressed in terms of % HAP, HAP emission concentration, and mass (kg) of HAP per mass (kg) of solids are not directly comparable to the coatings VOC limit which is expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4605 VOC limits.

**How does District Rule 4605 compare to rules in other air districts?**

District staff compared District Rule 4605 with the rules of other California ozone nonattainment air districts' rules (listed below) for aerospace operations. The results of the analysis are discussed below.

- A. South Coast Air Quality Management District (SCAQMD) Rule 1124 - Aerospace Assembly and Component Manufacturing Operations (Amended September 21, 2001)
- B. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 29 - Adhesive and Sealant Products (Amended December 20, 1995)
- C. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 456 - Aerospace Assembly and Component Coating Operations (Amended October 23, 2008)

D. Ventura County Air Pollution Control District (VCPCD) Rule 74.13 - Aerospace Assembly and Component Manufacturing Operations (Amended November 11, 2003)

The table below compares requirements for each of the rules. All coating and solvent limits are in g/L.

Exemptions	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Airbrushing		X			
Fabrication of Electronic Components	X				
Assembled Circuit Boards	X				
Low Use Facility		3 gal/day		200 lb-VOC/yr	4 gal/day
Military Corrosion Repair Coating		5 gal/day			
Clear/Translucent Coatings on Clear/Transparent Surfaces		X			
Paper Fabric Film	X				
Tank-Type Stripper	X				
Adhesives	X	X			10 gal/yr
Aerosol Cans	X	X	X	X	X
Non-Compliant Coatings	200 gal/yr	200 gal/yr	55 gal/yr	200 gal/yr	20 gal/yr
Stencil Coatings	X	X			
Touch Up Coatings		X			
Recoating of Assembled Aircraft with Original Coating Formulations		X			
Materials Marking Coatings		X			
R&D Laboratories		X			X
Solid Film Lubricant (Antichafe)	X				
Test Panels	X				
Temporary Marking Coatings		X			
Solvents (Space Vehicle)		X	X		
Solvents (Rocket Motor Lining)			X		
Solvents (Jet Engine or Rocket Engine Flushing)					X
Solvents (Prior to Adhesive Bonding)			X		
Solvents (Solar Cells, Fluid Systems, Avionic Equipment, Laser Optics)		X			
Solvents (Surfaces exposed to strong oxidizers or reducers)				X	
Satellite Coatings	X				
Primer (High Temp Curing Adhesive Bonding)	X				

Exemptions	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Spray Application Equipment (360 Degree Spray Gun Nozzle)	X				
Spray Application Equipment (Waterborne Extreme Performance Interior Topcoat)	X				
Spray Application Equipment (Adhesive Bonding/Pretreatment Wash Primers)	X				
Spray Application Equipment (Textured Finish Coat)	X				
Application Equipment (Touch Up and Repair)			X		
Coatings that contain fillers to decrease atomization with HVLP guns			X		
Hand Held Spray Containers w/non-refillable propellant			X		
Coatings added via Template, Stencil, Stamp, Hand Lettering			X		

Coating Type	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Ablative			600		
Adhesion Promoter		850		850	850
Adhesion Promoter (Sealant)			750		
Adhesive (Bonding Agent)			780		
Adhesive (General)			600		
Adhesive (Fuel Tank)		620		620	620
Adhesive (Non-Structural)		250		250	250
Adhesive (Structural Autoclavable)		50		50	50
Adhesive (Structural Non- Autoclavable)		850		850	850
Antichafe		420		600	600
Conformal Coating		750	600	750	750
Dry Lubricative Material					675
Electric/Radiation Effect Coating	800	800		800	800
Electrostatic Discharge			612		
Extreme Performance			750		
Fire-Resistant Coatings (Commercial)	600	650	600	650	650
Fire-Resistant Coatings (Military)		800			
Flight Test Coatings (Missiles)		420	420	420	420

Coating Type	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
or Single Use Target Craft)					
Flight Test Coatings (Other)		840		600	600
Fuel Tank Coatings	720	420	650	420	420
High Temperature Coating		850	420	850	850
Impact Resistant Coating		420		420	420
Lubricant (Solid Film - Fastener Mfr)		250		250	250
Lubricant (Dry Lubricative - Fastener Mfr)		120		250	120
Lubricant (Barrier - Fastener Mfr)		420			
Lubricant (Solid Film - Fastener Installation)		880	880	880	880
Lubricant (Dry Lubricative - Fastener Installation)		675			
Lubricant (Solid Film Non-Fastener Mfr)		880	880	880	880
Lubricant (Dry Lubricative Non-Fastener Mfr)		675		880	675
Maskants (General)			850		250
Maskants (Chemical Processing)		250			
Maskants (Chemical Milling Type I)		250	622	250	250
Maskants (Chemical Milling Type II)		160	160	250	250
Maskants (Photolithographic)		850			
Maskants (Touch-up, Line Sealer)		750			
Metalized Epoxy Coating		700			
Mold Release Coatings		780	762		
Optical Anti-Reflective Coating		700		700	700
Part Marking Coating			850		
Pretreatment Coatings				780	780
Primer (Commercial Exterior Aerodynamic Structure)					350
Primer (Adhesive Bonding)	850			780	805
Primer (Adhesive Bonding - New Commercial Aircraft)		250			250
Primer (Adhesive Bonding - Military Aircraft)		805			805
Primer (Adhesive Bonding - Remanufactured Commercial Aircraft Parts)		805			805
Primer (Adhesive Bonding - Sonic and Accoustic Applications)		805			805
Primer (Adhesive Bonding -		250			250

Coating Type	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Long Term)					
Primer (Adhesive Bonding - Short Term)		250			250
Primer (General)	350	350	350	350	350
Primer (Compatible Substrate)					350
Primer (Cryogenic Flexible)					350
Primer (Flexible)					350
Primer (Elevated Temperature Skydrol Resistant Commercial)					350
Primer (Low-Solids Corrosion Resistant Primer)		350			
Primer (Pretreatment)		780			
Primer (Pretreatment Wash)	420		780		350
Primer (Rain Erosion Resistant)		850			
Primer (Sealant Bonding)	720				350
Radiation Effect			600		
Rain Erosion Resistant Coating		800	600	420	800
Rain Erosion Resistant Coating (Fluoroelastomer)			800		
Scale Inhibitor		880		880	880
Sealant (Extrudable/Rollable/Brushable)	600	280			600
Sealant (Fastener)	600	675		675	675
Sealant (Other)		600	600	600	600
Sealant (Sprayable)	600				600
Space Vehicle Coatings (Electrostatic Discharge Protection)		800	880	800	800
Space Vehicle Coatings (Adhesives)		800		800	800
Space Vehicle Coatings (Other)		1,000	1,000	1,000	1,000
Temporary Protective Coating	250	250	250	250	250
Thermal Control Coating			600		
Thermal Expansion Release			762		
Topcoat (Acrylic Lacquer for F-111)			780		
Topcoat (General)	420	420	420	420	420
Topcoat (Barrier)				420	420
Topcoat (Clear)		520		520	520
Topcoat (Interior)	340				420
Topcoat (Interior - Extreme Performance)	420				420
Topcoat (Epoxy Polyamide)					420
Topcoat (Self Priming - Unicoat)	420	420	420	420	420

Coating Type	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Wet Fastener Installation Coating			620		
Wing Coating		750		420	750
Wire Coating (Electronic)				420	420
Wire Coating (Anti-Wicking)				420	420
Wire Coating (Other)		420			
Wire Coating (Pre-Bonding Etching)				420	420
Wire Coating (Phosphate Ester Resistant Ink)		925		925	925

Application Methods	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Brush or Roll Coat	X	X	X	X	X
Dip Coat	X	X	X	X	X
Detailing Gun	X	X	X	X	X
Electro deposition	X	X	X	X	X
Electrostatic Spray	X	X	X	X	X
Flow Coat	X	X	X	X	X
Hand Application	X	X	X	X	X
HVLP Spray	X	X	X	X	X
LVLP Spray			X		
Other, Transfer Efficiency Minimum	X	X	X	X	X

Add-on Control Efficiency	Bay Area (Rule 8-29)	South Coast (Rule 1124)	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Capture		90%			90%
Control	85%	95%			95%
Overall Control		86%	85%	85%	86%

Solvents	Bay Area (Rule 8-29)	South Coast (Rule 1171)*	Sac Metro (Rule 456)	Ventura (Rule 74.13)	SJV (Rule 4605)
Cleaning (General)	No Limit	Exempt	200	200	200
Coating Strippers	400	Exempt	300	300	300
Cleaning (Application Equipment)	Enclosed system (or Equiv)	Enclosed system (or Equiv)	Enclosed system (or Equiv)	Enclosed system (or Equiv)	Enclosed system (or Equiv)

\*Per Rule 1171 (Solvent Cleaning)



As shown in the table above, SJVAPCD Rule 4605 varies in stringency when compared to other Districts' adhesive requirements. However, for the majority of categories, Rule 4605 is as stringent as or more stringent than the other District Rules.

**Conclusion**

District staff concludes that District Rule 4605 satisfies RACT for aerospace assembly and component coating operations.

## Rule 4606 – Wood Products and Flat Wood Products Coating Operations

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9

(Source: District 2007 Ozone Plan)

### District Rule 4606 Description

District Rule 4606, recently amended on October 16, 2008, controls VOC emissions from wood products coating operations and flat wood paneling products coating operations, and from the organic solvent cleaning, storage and disposal of solvents, and waste solvent materials associated with such coating operations. District Rule 4606 rule specifies the VOC content limits of coatings used on wood products which range from 125 grams/liter to 750 grams/liter (excluding water and exempt compounds, as applied) depending on the type of coating. For flat wood paneling products, the VOC content limit is 250 grams/liter (excluding water and exempt compounds, as applied). The VOC content limit for solvents used in cleaning operations is 25 grams/liter of material. In lieu of complying with the specified VOC content limits of coatings and solvents, operators may use a VOC emission control system with specified capture and control efficiency of at least 85 percent for wood coating operation, and at least 90 percent for flat wood paneling products coating operations.

District Rule 4606 exempts aerosol coatings for touch up and repair; wood products coating operations that use a total of less than 20 gallons per year in a stationary source; coatings application by template to add letters, designs or numbers to wood products; coating application to wooden musical instruments; residential non-commercial coating operation; architectural coating application; refinishing, replacement, and custom replica furniture operations; and specific finishes coatings.

### How does District Rule 4606 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

##### *1. EPA-453/R-96-007 CTG for Wood Furniture Manufacturing Operations*

The CTG applies to wood furniture manufacturing facilities located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas. The CTG specifies VOC limits only for

topcoats and sealers, but not for any other coating types which range from 0.8 to 2.3 lb VOC/lb solid (equivalent to 460 to 660 grams/liter of coating). District Rule 4606 VOC limits 275 grams/liter for topcoats and sealers are more stringent than the CTG limits. The CTG does not exempt refinishing, replacement and custom replica furniture coating operations, but District Rule 4606 exempts such operations from meeting the VOC limits. However, a review of the District's Permit to Operate (PTO) database indicates that there are only two permitted refinishing coating application facilities operating in the San Joaquin Valley. The annual VOC emission of one facility is 0.2 tons/year and is using a coating with a VOC limit of 2.14 lb/gal which is less than 2.3 lb/gal VOC limit of District Rule 4606. The annual VOC emissions of the other facility is 0.8 tons/year and uses low VOC stains with a VOC content of 0.58 lb/gal, sealers with a VOC content of 0.51 lb/gal, topcoats with a VOC content of 0.58 lb/gal, pigmented coatings with a VOC content of 2.3 lb/gal which are within the specified VOC limits of District Rule 4606.

In response to April 1, 2009 EPA comments recommending more detailed discussion regarding the exemption Rule 4606 exemption for refinishing, replacement and custom replica coating operations, District staff has included the following justifications:

- The only two permitted facilities in the San Joaquin Valley are using compliant coatings that meet the VOC limits of Rule 4606 as discussed above.
- The total VOC emissions of 0.28 tons/year (0.00077 tons/day) from refinishing, replacement and custom replica furniture coating operations in the District is only 0.05% of 474.5 tons/year (1.3 tons/day) 2008 baseline emissions inventory.
- The annual VOC emissions of each exempted facility (0.2 tons/year and 8 tons/year) are much less than the CTG applicability threshold of 10 tons/year of VOC per facility. Therefore, the CTG does not apply to these refinishing facilities.

## 2. *EPA 453-06-004 CTG for Flat Wood Paneling Coatings*

District Rule 4606 VOC limit of 250 grams/liter for coatings, inks, or adhesives applied to flat wood paneling products are the same as the limit in the CTG. Based on the discussion above, District staff deems District Rule 4606 satisfies RACT.

### **B. EPA – Alternative Control Technology (ACT)**

There is no EPA ACT guidance document for wood coating operations.

### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for wood products coating operations or flat wood paneling products coating operations.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

##### *1. 40 CFR 63 Subpart JJ (National Emission Standards for Wood Furniture Manufacturing)*

This NESHAP applies to wood furniture manufacturing sources that are not exempt under the following conditions: (1) a source that uses no more than 250 gallons per month, for every month, of coating, gluing, cleaning, and wash off materials at the source; (2) a source that uses no more than 3,000 gallons per rolling 12-month period, for every 12-month period, of coating, gluing, cleaning, and wash off materials at the source, including materials used for source categories other than wood furniture (surface coating); or (3) a source that emits no more than 4.5 Mg (5 tons) of any one HAP per rolling 12-month period and no more than 11.4 Mg (12.5 tons) of any combination of HAP per rolling 12-month period, and at least 90 percent of the plant wide emissions per rolling 12-month period are associated with the manufacture of wood furniture or wood furniture components. Exempt sources are required to maintain monthly records of the amount of VOC-containing materials used and such records have to be kept for a period of five years.

It is important to mention that the NESHAP HAP emission limit which is expressed in terms of mass (kg) of HAP per mass (kg) of solids is not directly comparable to the coatings VOC limit which is expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4606 VOC limits.

##### *2. 40 CFR 63 Subpart DDDD—National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products*

This NESHAP applies sources that manufacture plywood and/or composite wood products by bonding wood material (fibers, particles, strands, veneers, etc.) or agricultural fiber, generally with resin under heat and pressure, to form a structural panel or engineered wood product, and that emit or have the potential to emit any single HAP at a rate of 9.07 megagrams (10 tons) or more per year or any combination of HAP at a rate of 22.68 megagrams (25 tons) or more per year. Plywood and composite wood products manufacturing facilities also include facilities that manufacture dry veneer and lumber kilns located at any facility.

It is important to mention that the NESHAP HAP emission limit which is expressed in terms of mass (kg) of HAP per mass (kg) of solids is not directly comparable to the coatings VOC limit which is expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4606 VOC limits.

Currently, there is no plywood or composite wood products manufacturing companies operating within the San Joaquin Valley.

3. *40 CFR 63 Subpart QQQQ (National Emission Standards for Surface Coating of Wood Building Products)*

This NESHAP applies to sources that perform surface coating operations involving wood building products that use at least 4,170 liters (1,100 gallons) of coating per year, and is a major source, is located at a major source, or is a part of a major source of HAP emissions. A major source is a source that has the potential to emit 9.0 megagrams/yr (10 tons/yr) of any single HAP or 22.68 megagrams/yr (25 tons/yr) of any combination of HAP. This NESHAP applies to new, reconstructed, and existing source (a new affected source is one on which construction commenced after 6/21/02). The NESHAP specifies work practice standards, monitoring and recordkeeping.

It is important to mention that the NESHAP HAP emission limit which is expressed in terms of mass (kg) of HAP per mass (kg) of solids is not directly comparable to the coatings VOC limit which is expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4606 VOC limits.

### **How does District Rule 4606 compare to rules in other air districts?**

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4604 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1136 (Wood Products Coatings) amended June 14, 1996
- SCAQMD Rule 1104 (Wood Flat Stock Coating Operations) amended August 13, 1999
- BAAQMD Regulation 8 Rule 23 (Coating of Flat Wood Paneling and Wood Flat Stock) amended December 20, 1995
- BAAQMD Regulation 8 Rule 32 (Wood Products Coatings) amended June 19, 1996
- Sacramento Metropolitan Air Quality Management District (SMQMD) Rule 463 (Wood Products Coating) amended July 23, 1998
- Ventura County Air Pollution Control District (VCPCD) Rule 74.30 (Wood Products Coatings) amended June 6, 2006.

## A. SCAQMD Rule 1136 (Wood Products Coatings)

SCAQMD Rule 1136 applies to coating operations on any wood products. The VOC limits range from 120 to 750 grams/liter for coatings depending on the coating type and 500 grams/liter for inks. As an alternate compliance option to using compliant coatings, the rule allows operators to use emissions averaging for all or a portion of the coatings at a facility in provided the actual emissions from the coatings being averaged do not exceed the emissions generated by complying with the specified coating limits. The rule includes coating application equipment requirements and a VOC limit for solvent cleaning and surface preparation pursuant to SCAQMD Rule 1171 (Solvent Cleaning Operations). The rule exempts facilities that use one gallon/day or less of coating. In addition, the rule exempts japans provided the VOC content is 700 grams/liter or less. The rule also allows the addition of 10% by volume to topcoat, primer, sealer or undercoat to avoid blushing during high humidity provided the coating contains no more than 550 grams/liter of VOC and the coating is not applied from April 1 to October 31 of any year. The rule does not exempt refinishing, replacement, and custom replica furniture coating operations.

District Rule 4606 has the same VOC content limits as SCAQMD Rule 1136, except that District Rule 4606 VOC limit of 240 grams/liter is lower than SCAQMD Rule 1136 limit of 350 grams/liter. District Rule 4606 does not allow operators to use emissions averaging, but SCAQMD Rule 1136 allows it as a compliance option instead of using compliant materials. District Rule 4606 allows an operator to install and operate a VOC emission control system with a specified capture and control efficiency in lieu of using compliant coatings. The coating application methods specified in District Rule 4606 are identical to SCAQMD Rule 1136. The solvents cleaning VOC limit of 25 grams/liter in District Rule 4606 is the same as the SCAQMD solvent cleaning limit for this source category which regulated under SCAQMD Rule 1171.

SCAQMD Rule 1136 exemption from the VOC limits and coating application method for facilities that use less than one gallon per day or less of coating is less stringent than District Rule 4606 exemption for facilities that use 20 gallons per year of coating. District Rule 4606 exempts refinishing, replacement, and custom replica furniture coating operations but SCAQMD Rule 1136 does not exempt such coating operations. As discussed in Section III.A above, there are only two permitted facilities that performs refinishing coating operations and their total combined annual VOC emissions are insignificant (1 ton/year or 5 lb/day of VOC) which is insignificant. SCAQMD Rule 1136 allows the use of japans with a high VOC limit of 700 grams/liter, but District Rule 4606 considers japans as pigmented coating subject to 275 grams/liter VOC limit. District SCAQMD Rule 1136 allows the addition of 10% by volume to topcoat, primer, sealer or undercoat, but District Rule 4606 does not allow it. The coating application equipment and solvent cleaning requirements of District Rule 4606 are as stringent as SCAQMD Rule 1136. Based on the above discussion, in spite of exemption for refinishing operations, District staff deems that overall District Rule 4606 is as stringent as SCAQMD Rule 1136.

**B. SCAQMD Rule 1104 (Wood Flat Stock Coating Operations)**

SCAQMD Rule 1104 applies to manufacturing of finished wood panel. The VOC limit is 250 grams/liter for coatings, inks, and adhesives. In lieu of complying with the VOC limit, an operator may use a VOC control equipment that reduces the emissions by at least 95 percent or the output of the control device is less than 50 ppm and provided the efficiency of the collection system is at least 90 percent. District Rule 4606 has the same coating VOC limits but the VOC emission system's capture and control efficiency is more stringent by an additional 5 percent [i.e., 90 percent overall capture and control efficiency for flat wood paneling products coating operations versus SCAQMD Rule 1104 control efficiency of 85.5 percent (95 percent control x 90 percent capture)].

The coating application methods specified in District Rule 4606 are identical to SCAQMD Rule 1104. The solvents cleaning VOC limit of 25 grams/liter in Rule 4606 is the same as the SCAQMD solvent cleaning limit for this source category which regulated under a separate rule SCAQMD Rule 1171 (Solvent Cleaning Operations). Based on the above discussion, District Rule 4606 is more stringent than SCAQMD Rule 1104 based on the VOC emission control system overall capture and control efficiency.

**C. BAAQMD Regulation 8 Rule 23 (Coating of Flat Wood Paneling and Wood Flat Stock)**

BAAQMD Regulation 8 Rule 23 applies to the application of coatings and adhesives to flat wood and wood flat stock products. The VOC limit for coatings, adhesives, and inks is 250 grams/liter. The rule allows operators to use an air pollution abatement device with an efficiency of at least 90 percent. Overall, the emission limits and control device efficiency requirements of BAAQMD Regulation 8 Rule 23 is as stringent as District Rule 4606 for this source category.

**D. BAAQMD Regulation 8 Rule 32 (Wood Products Coatings)**

BAAQMD Regulation 8 Rule 32 applies to wood products coating operations. The rule has separate coating VOC limits depending on the type of wood products. The VOC limits for general wood product range from 275 to 700 grams/liter depending on the type of coating. The VOC limits for furniture, custom cabinetry, and custom architectural millwork range from 480 to 700 grams/liter. For custom and contract furniture, the VOC limits range from 480 to 700 grams/liter. The rule does not have a VOC limit for stripper. In lieu of using compliant coatings, the rule allows an operator to use an air pollution abatement equipment has an abatement efficiency of at least 85 percent. In addition, operators may demonstrate compliance with the VOC limits by averaging (multiple day periods on a rolling basis for a period no greater than 30 days) any or all coatings and solvent usage directly to the coating of wood products. The rule contains several exemptions such as facilities that use a total of less than 20 gallons of coatings per year; refinishing, replacement, and custom replica furniture; stencil coatings; musical

instruments; and other types of exemptions. In addition the rule also exempts facilities that use low VOC coatings that are high solid coatings with a VOC content of no more than 275 grams/liter and low solids coatings with a VOC content of no more than 120 grams/liter. The rule includes solvent evaporative loss minimization as well as coating application equipment requirements.

In comparison, District Rule 4606 VOC limits range from 120 to 500 grams/liter for coatings and 750 grams/liter for inks for all types of wood products. The stripper VOC limit is 350 grams/liter. District Rule 4606 also exempts refinishing, replacement, and custom replica furniture coating operations and facilities that use less than 20 gallons per year of coatings, but does not exempt facilities that use low VOC coatings as provided by BAAQMD Regulation 8 Rule 32. Based on the above discussion staff deems that, overall, District Rule 4606 is more stringent than BAAQMD Regulation 8 Rule 32.

#### **E. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 463 (Wood Products Coating)**

SCAQMD Rule 463 applies to coatings, strippers, used in wood products wood products coating operations and solvents used in surface preparation and cleanup. The coatings VOC limits for new wood products range from 120 to 750 grams/liter of coating depending on the type coating. The coatings VOC limits for refinishing, repairing, preserving, or restoring wood products range from 480 to 700 grams/liter depending on the type of coating. The VOC limit for stripper is 350 grams/liter or a VOC composite partial vapor pressure of 2 mm Hg (0.04 psia) or less at 68<sup>0</sup>F. In lieu of complying with the VOC limits, an operator may use an air pollution control device which reduces the emissions by an equivalent or greater amount than the emissions resulting from the use of compliant coatings and strippers. The rule also allows operators to use an approved emission averaging method which demonstrates that the emissions from all the coatings being averaged are less than the allowable emissions from using compliant materials. The rule contains coating application equipment and solvent cleanup and surface preparation requirements. The VOC limit for solvent cleanup and surface preparation is 200 grams/liter. The rule contains several exemptions such as sources using less than 55 gallons/year, coating operations for the purpose of manufacturing finished wood panels, non-refillable aerosol coatings, and stencil coatings.

In comparison, District Rule 4606 coatings VOC limits are the same as SMAQMD Rule 463 limits for new wood products. However, District Rule 4606 exempts refinishing, replacement, and custom replica furniture coatings operations. As discussed in Section III.A above, there are only two permitted facilities that performs refinishing coating operations and their total combined annual VOC emissions are insignificant (1 ton/year or 5.5 lb/day of VOC). District Rule 4606 only allows the use of strippers with a VOC limit of 350 grams/liter, but SMAQMD Rule 463 allows the use of a stripper with either a composite partial vapor of 2 mm Hg (0.04 psia) or less at 68<sup>0</sup>F or with a VOC limit of 350 grams/liter. In addition, District Rule 4606 solvent cleanup and surface preparation VOC limit is 25 grams/liter which is more stringent than SMAQMD Rule 462 limit of 200



grams/liter. Based on the above discussion, District staff deems that overall District Rule 4606 is as stringent as SCAQMD Rule 463.

**F. Ventura County Air Pollution Control District (VCPCD) Rule 74.30 (Wood Products Coatings)**

VCPCD Rule 74.30 applies to coatings used in wood products. The VOC limits for new wood product or new simulated wood products range from 120 to 500 grams/liter for coatings, 240 grams/liter for sealers, and 750 grams/liter for inks. For refinishing operation, the VOC limits range from 480 to 680 grams for coatings and 750 grams/liter for inks. The VOC limit for stripper is 350 grams/liter or a VOC composite partial vapor pressure of 2 mm Hg (0.04 psia) or less at 68<sup>o</sup>F. The rule allows the use of an emission control system that achieves a combined capture and control efficiency of at least 90 percent. The rule contains coating application equipment and solvent cleanup and surface preparation requirements. The VOC limit for solvent cleaning is 25 grams/liter. The rule exempts facilities that emit less than 200 pounds in every rolling 12 consecutive calendar months. Also exempt is coating of wooden musical instruments.

In comparison, District Rule 4606 coatings VOC limits are the same as VCAPCD Rule 74.30 limits for new wood products, except the VOC limit of 275 grams/liter for sealers is slightly higher than Ventura's 240 grams/liter limit. Unlike VCAPCD Rule 74.30, District Rule 4606 exempts sources that perform refinishing coating operations. As discussed in Section III.A above, there are only two permitted facilities that perform refinishing coating operations and their total combined annual VOC emissions are not significant (1 ton/year or 5.5 lb/day of VOC). District Rule 4606 only allows the use of strippers with a VOC limit of 350 grams/liter, but VCPCD Rule 74.30 allows the use of a stripper with either a composite partial vapor of 2 mm Hg (0.04 psia) or less at 68<sup>o</sup>F or with a VOC limit of 350 grams/liter. District Rule 4606 emission control system efficiency of 85 percent for wood products coating operations is less stringent than VCPACD Rule 74.30 control efficiency of 90 percent. However, a review of the District's Permit to Operate database indicates that there are no wood coating facilities in the San Joaquin Valley that operate a VOC emission control system as a compliance option in lieu of using compliant coatings required by District Rule 4606. Therefore, increasing the capture and control efficiency of the VOC control system from 85 percent to 90 percent would not result in any emissions reductions from current level.

VCPCD Rule 74.30 exemption for facilities that emit 200 lb/year of VOC or less is slightly less stringent than District Rule 4606 exemption of 20 gallons/year per facility (assume a VOC limit of 6.7 lb/gal, 20 gallons of coating/year exemption would only emit 134 lb/year of VOC). Based on the above discussion staff deems that, overall, District Rule 4606 as stringent as VCPACD Rule 74.30.

**Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4606 satisfies RACT for wood products and flat wood products coating operations.

## Rule 4607 – Graphic Arts

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	1.7	1.7	1.9	1.9	2.1	2.2	2.3	2.3

(Source: District 2007 Ozone Plan)

### District Rule 4607 Description

This source category includes any graphic arts printing operation, to any paper, fabric film, or foil coating operation, to the organic solvent cleaning, and to the storage and disposal of solvents and waste solvent materials associated with these operations.

### How does District Rule 4607 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

1. *EPA 450/2-77-008 – Control Technique Guidelines for Control of VOCs from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks*

Out of the six surface coating operations covered by the CTG, two are part of District Rule 4607 (Graphic Arts) – paper coating and fabric coating. The CTG-recommended VOC content limits for coatings within these source categories ranges from 290 grams per liter to 380 grams per liter depending on coating type. The CTG also allows operators to use higher VOC content materials if the operator uses an add-on VOC emission control system with overall capture and control efficiency of at least 81%.

The coating VOC content limits in the CTG are higher than the VOC content limit of 265 grams per liter for the same categories in District Rule 4607. The required overall capture and control efficiency for paper and fabric coating operations in District Rule 4607 is 90%, which is higher than the 81% overall capture and control efficiency recommended in the CTG.

2. *EPA 450/2-78-033 – Control Techniques Guidelines for Control of VOCs from Existing Stationary Sources – Volume VIII: Graphic Arts - Rotogravure and Flexography*

This CTG applies to printing and coating operations using rotogravure (gravure) and flexography (flexo). The CTG acknowledges that these operations tend to use high

VOC inks and coatings for technical reasons. Because of this, the CTG first discusses add-on controls for these operations, followed by ink VOC content limits.

Recommended overall capture and control efficiencies depend on the printing technology and the product. For publication gravure and publication flexo, recommended the overall capture and control is broken into its components - 75% capture and 90 to 95% control, meaning that the overall capture and control would be the capture multiplied by the control, which is minimally 67.5%. For packaging gravure, overall capture and control efficiency is recommended at 65% and all non-publication flexo at 60% overall capture and control.

The CTG recommends that 25% of the volatile portion of the ink as solvent for water-borne gravure and water-borne flexo inks and a 70% reduction in solvent usage compared to all-solvent inks as being comparable to an add-on VOC control system. The CTG also recommends an exemption for inks with more than 60% non-volatiles.

The CTG recommendations for inks cannot be directly compared to the VOC content limits for inks in District Rule 4607. The District rule limits inks and other materials to a specific VOC content in grams VOC per liter material, minus water and exempt compounds. The CTG does not have VOC content expressed in these units; therefore it is difficult to determine whether the CTG and the District rule are equivalent. Any comparison for water-borne inks would have to be done on a case-by-case basis for individual inks because the ratio of water to solvent could be different for each water-borne ink and the water/solvent ratio is not directly tied to the VOC content as evaluated by the District rule. Evaluating solvent-based ink reductions would also be problematic since the volume of solids per volume of material could greatly affect the overall VOC content when the content is expressed per liter of material, minus water and exempt compounds.

Current District Rule 4607 specifies overall control for add-on control devices used in graphic arts operations into three groups. The VOC emission control system is required to have an overall capture and control efficiency of at least 80% for flexible packaging printing (regardless of printing technology used), 85% for publication gravure, and 75% for other types of graphic arts printing operations.

### *3. EPA 453/R-06-002 – Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing*

This CTG, promulgated by EPA September 2006, provides control recommendations for reducing VOC emissions stemming from the use of fountain solutions, cleaning materials, inks in offset lithographic printing and cleaning materials, and inks in letterpress printing. The CTG contains three mechanisms to reduce VOC emissions from offset lithographic printing and letterpress printing. These options are add-on controls, process modifications or work practices, and material reformulation or substitution. The recommended level of control for VOC emissions from dryers for heat-set operations is either 90% or 95% control efficiency depending on the control device's

installation date. The CTG recommends applying controls to offset lithographic printing operation where emissions associated with all aspects of that operation equal or exceed 6.8 kg per day (15 pounds per day) actual emissions of VOC or an equivalent level, before consideration of controls. The allowable VOC content depends on the specific ink (heat-set or cold-set) and feed type (web-fed or sheet-fed). The allowable VOC content is further modified through how much alcohol is allowed in the fountain solution. The CTG recommends that the control for fountain solution not be applied to sheet-fed presses with maximum sheet size of 11X17 inches or smaller, or to any press with total fountain solution reservoir of less than 1 gallon. District Rule 4607 has been recently amended to incorporate the recommendations of this CTG.

The CTG recommends the use of cleaning materials with a VOC composite vapor pressure less than 10mm Hg at 20°C or cleaning materials containing less than 70 weight percent VOC for blanket washing, roller washing, plate cleaners, metering roller cleaners, impression cylinder cleaners, rubber rejuvenators, and other cleaners used for cleaning a press, press parts, or to remove dried ink from areas around a press. Additionally, cleaning materials and used shop towels should be kept in closed containers. Current District Rule 4607 has a specific allowable VOC content limit for different cleaning operations, which is not directly comparable to a vapor pressure limit. The solvent cleaning VOC content limit for solvent cleaning related to flexo and gravure printing are less than the recommended VOC content recommended in the CTG. The District rule incorporates work practices similar to the CTG.

#### 4. *EPA 453/R-06-003 – Control Techniques Guidelines for Flexible Package Printing*

This CTG, promulgated by EPA September 2006, provides control recommendations for reducing VOC emissions from inks, coatings, adhesives and cleaning materials used by the rotogravure and flexographic printing industries for flexible packaging printing. The two approaches to reducing VOC emissions from inks, coatings, and adhesives used in the flexible package printing industry are adding or improving add-on emission controls, and material reformulation or substitution.

The primary thrust of the CTG is control of emissions through add-on emission controls. As such, the CTG outlines overall control efficiency for presses, depending on the date the press was first installed and the date an add-on control was first installed. The range of overall control is 65% to 80%. As an alternative to the overall control requirements, the CTG also recommends two equivalent VOC content limits for inks which can be met by use of low VOC content materials or a combination of materials and controls. These VOC content limits are consistent with an 80 percent overall emission reduction level and reflect similar control levels as the capture and control option. The CTG does not recommend a specific VOC content limit for materials used during cleaning, but does recommend certain work practices to limit emissions during cleaning. Current District Rule 4607 has a specific allowable VOC content limit for different cleaning operations and incorporates work practices similar to the CTG.

District Rule 4607 has recently been amended to incorporate those CTG recommendations that were less stringent.

5. *EPA 453/R-07-003 – Control Techniques Guidelines for Paper, Film, and Foil Coatings*

This CTG provides control recommendations for reducing VOC emissions stemming from the use of coatings in paper, film, and foil surface coating operations. Coating performed on or in-line with any offset lithographic, screen, letterpress, flexographic, rotogravure, or digital printing press is part of a printing process and is not part of the paper, film, and foil coating category. Common control techniques for reducing VOC emissions from paper, film, and foil surface coatings include pollution prevention measures and the operation of emission capture and add-on control systems.

Overall VOC control efficiency of 90 percent is recommended for each paper, film, and foil surface coating line. As an alternative to an overall 90 percent control efficiency, the CTG recommends VOC content-based emission limits that are equivalent to 90 percent overall control, which can be met by use of low-VOC content materials or combinations of materials and controls. EPA recommends the limit of 0.20 kg VOC/kg (0.20 lb VOC/lb) solids applied and an additional equivalent limit of 0.067 kg VOC/kg (0.067 lb VOC/lb) of coatings as RACT for pressure sensitive tape and label surface coating lines. District Rule 4607 has been recently amended to include the recommendations of this CTG.

The CTG does not recommend a specific VOC content limit for materials used during cleaning, but does recommend certain work practices to limit emissions during cleaning. Current District Rule 4607 has a specific allowable VOC content limit for different cleaning operations and includes the CTG-recommended work practices.

**B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

**C. Standards of Performance for New Stationary Sources (NSPS)**

1. *40 CFR 60 Subpart QQ – Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing*

This NSPS applies to each publication rotogravure printing press at a facility that commenced construction, modification, or reconstruction after October 28, 1980. The NSPS does not apply to proof presses.

The NSPS requires that emitted VOC be no more than 16 percent of the total mass of VOC solvent and water used at that facility during any 30-consecutive calendar day averaging period. The water used includes only that water contained in the waterborne

raw inks and related coatings and the water added for dilution with waterborne ink systems.

The NSPS provision cannot be directly compared to the VOC content limits for inks or compared to the control efficiency limits in District Rule 4607. The NSPS is based on the volatile (water plus solvent) emissions from the operation as a whole and, therefore, it is difficult to determine whether the NSPS and the District rule are equivalent. The District rule limits inks and other materials to a specific VOC content in grams VOC per liter material, minus water and minus exempt compounds. Further, the District rule has a minimum overall capture and control requirement for add-on emission control systems. Any comparison would have to be done on a case-by-case basis for individual facilities because the ratio of water to solvent could be different for each facility and the solvent-to-water ratio is not directly tied to the VOC content or the emission control system control efficiency.

2. *40 CFR 60 Subpart RR – Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations*

This NSPS applies to coatings for pressure sensitive tape and labels where the coating operations are located at a facility which began construction, modification, or reconstruction after December 30, 1980. There are two ways to control emissions – through VOC content limit and by specifying the overall capture and control of the add-on control device. The VOC content limit is listed in pounds of VOC per pound of coatings solids. The alternative overall capture and control required is 90%.

District Rule 4607 incorporates the VOC content limits as a specific requirement in the rule as well as having an overall capture and control efficiency of at least 90% for these operations.

3. *40 CFR 60 Subpart FFF – Standards of Performance for Flexible Vinyl and Urethane Coating and Printing*

The affected facility is a facility which began construction, modification, or reconstruction after January 18, 1983. The operation subject to the NSPS is rotogravure printers used to print or coat flexible vinyl or urethane products. The NSPS requires that the operator use inks with a weighted average VOC content less than 1.0 kilogram VOC per kilogram ink solids at each affected facility, or, equivalently, to reduce VOC emissions by 85 percent from the facility.

District Rule 4607 does not address this source category as a specific sub-category of the graphic arts. Gravure printers/coaters are held to an ink VOC content of 300 grams per liter of material, minus water and exempt compounds. This is not directly comparable to the NSPS VOC content. In lieu of meeting the VOC content limits, operators could choose to use a VOC control system to reduce their emissions from printing, however, use of the system cannot have emission more than would have occurred if the operator used compliant materials. In District Rule 4607, the minimum

overall capture and control efficiency is 75% for VOC emission control systems for gravure printing/coating other than flexible packaging and publication. It is difficult to determine whether the NSPS and the current District rule are equivalent – such comparisons would need to be done on a coating-by-coating basis.

4. *40 CFR 60 Subpart SSS – Standards of Performance for Magnetic Tape Coating Facilities*

Subpart SSS applies to coating operations and coating mix preparation operations located at a magnetic tape manufacturing facility for which construction, modification, or reconstruction began after January 22, 1986. Of the two operations, only the coating operations correspond to District Rule 4607 sources. The provisions of this subpart that apply to coating operations will be used for this analysis.

Control of coating VOCs is through a VOC emission control device with overall capture and control ranging from 90% to 95%, depending on whether the operation is new or modified/reconstructed and whether the VOC emission control system is control device is new or has been modified/reconstructed.

Because magnetic tape is a special coating on film, magnetic tape manufacturers would be considered film coaters for District Rule 4607. As such, they would be subject to an overall capture and control efficiency of at least 90%. However, the District has no sources that manufacture magnetic tape. Any new source that would begin operations would be subject to the District New and Modified Source Review Rule, which would require that the new operation meet this NSPS as a minimum standard.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There are no NESHAPs in 40 CFR 61 directly applicable to sources subject to District Rule 4607. There are three MACTs in 40 CFR 63 that apply to sources subject to District Rule 4607.

1. *40 CFR 63 Subpart KK – National Emission Standards for the Printing and Publishing Industry*

This MACT applies to major sources of hazardous air pollutants (HAPs) that perform rotogravure printing for the publication, product, or packaging markets. It also applies to wide-web flexographic printing that is a major source of HAPs.

For publication rotogravure, emissions of HAPs are limited to no more than 8% of the total volatile matter used each month. Operators may comply with this limit with an add-on emission control system having overall capture and control efficiency of at least 92%, by substitution of non-HAP materials for organic HAP, or by a combination of both.



In the case of product rotogravure, packaging rotogravure, and wide-web flexographic printing operations, the emission of HAPs has three numeric limits. The first limit is that emissions are limited to no more than 5% of the organic HAP applied for the month. The second limit is that the HAPs emissions are no more than 4% of the total mass of inks, coatings, varnishes, adhesives, primers, solvents, reducers, thinners, and other materials applied during the month. The third limit is that HAPs emissions are no more than 20% of the mass of solids applied during the month. Operators may use an emission control device with overall HAP control efficiency of at least 95% and that limits the emissions to no more than would have been emitted had they complied with all three numeric limits.

HAPs and VOCs are not directly comparable. The VOC contents in District Rule 4607 are given in units of pounds of VOC per liter of material, minus water and minus exempt compounds. Subpart KK has different units of measure for HAPs. Not only are the units of measure different, a given HAP compound may not be photo-chemically reactive, meaning that the HAP is an exempt compound and not counted as a VOC. Thus, the NESHAP does not define applicable RACT for these sources.

2. *40 CFR 63 Subpart JJJJ – National Emission Standards for Hazardous Air Pollutants: Paper and Other Web Coating*

This subpart of the CFR applies to facilities that perform web coating and the facility is a major source of HAPs. Exemptions include web coating done with lithography, screen printing, letterpress, and narrow-web flexographic printing as well as any web coating subject to a different subpart of 40 CFR 63. Research and laboratory equipment is also exempt.

The subpart limits the emission of HAPs relative to the amount of HAPs. Because the particular HAPs emitted may not be an exempt compound and not, therefore, a VOC, the emission limits in this MACT are not directly comparable to VOC content limits. HAPs and VOCs are not directly comparable. The VOC content limits in District Rule 4607 are given in units of pounds of VOC per liter of material, minus water and minus exempt compounds. Thus, the NESHAP does not define applicable RACT for these sources.

3. *40 CFR 63 Subpart OOOO – National Emission Standards for Hazardous Air Pollutants: Printing, Coating, and Dyeing of Fabrics and Other Textiles*

40 CFR 63 Subpart OOOO applies to facilities that are major HAPs sources that coat, print, dye, slash, or finish fabrics and other textiles. There are five exemptions: if the particular operation does not use materials with organic HAPs, if the operations occur at a research or laboratory, if the materials are used internally (not for commerce), if the operations are conducted at ambient temperatures (no heaters or dryers), and if the facility is located on a US Armed Forces installation.

HAPs and VOCs are not directly comparable. The VOC contents in District Rule 4607 are given in units of pounds of VOC per liter of material, minus water and minus exempt compounds. Subpart KK has different units of measure for HAPs. Not only are the units of measure different, a given HAP compound may not be photo-chemically reactive, meaning that the HAP is an exempt compound and not counted as a VOC. Thus, the NESHAP does not define applicable RACT for these sources.

### **How does District Rule 4607 compare to rules in other air districts?**

District staff compared VOC content limits, optional control requirements, and work practice standards in District Rule 4607 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1128, as amended March 1996
- South Coast AQMD Rule 1130, as amended October 1999
- South Coast AQMD Rule 1130.1, as amended December 1996
- South Coast AQMD Rule 1171, as amended February 2008
- Bay Area AQMD Regulation 8 Rule 4, as amended October 2002
- Bay Area AQMD Regulation 8 Rule 12, as amended December 1995
- Bay Area AQMD Regulation 8 Rule 20, as amended November 2008
- Sacramento Metropolitan AQMD Rule 450, as amended March 2000
- Sacramento Metropolitan does not have a prohibitory rule for paper, film, foil or fabric coating.
- Ventura County APCD Rule 74.19, as amended November 2003
- Ventura County APCD Rule 74.19-1, as amended November 2003
- Ventura County APCD Rule 74.3, as amended December 1991

#### **A. South Coast AQMD Rule 1128 (Paper, Fabric and Film Coating Operations)**

South Coast AQMD Rule 1128 applies to all persons applying coatings or wash primers to paper, fabric, or film substrates. Coating VOC content is limited to 265 grams VOC per liter of coating less water and less exempt compounds, as applied. Plastisol is limited to 20 grams VOC per liter of material less water and less exempt compounds, as applied. Wash primer is limited to 365 grams VOC per liter of material used. In lieu of using compliant materials, an operator may install and operate an approved VOC emission control system. The collection portion of the system must collect at least 90% of the VOC vapors and the control portion of the system must destroy at least 95% of the collected vapors or the control device emit no more than 50 parts per million without dilution.

District Rule 4607 VOC content limits for materials used for paper, fabric, and film are similar to South Coast Rule 1128 for coatings. The overall capture and control efficiency for these operations is at least 90% which is higher than the overall capture and control of the South Coast rule (90% times 95% or 85.5%).

## **B. South Coast AQMD Rule 1130 (Graphic Arts)**

South Coast Rule 1130 applies to persons performing graphic arts operations or who solicit, specify, offer for sale, sell, or distribute graphic arts materials for use in the South Coast AQMD.

If an operation is subject to the control requirements of the rule, there are VOC content limits. Coatings and inks have a VOC content limit of 300 grams VOC per liter material, minus water and exempt compounds, as applied; except certain flexographic inks. The VOC content limit for flexographic ink applied on a non-porous substrate is the same as for other inks and coatings – 300 grams per liter minus water and exempt compounds. The VOC content limit for flexographic ink on a porous substrate is 225 grams per liter minus water and exempt compounds, as applied. Adhesives and web-splicing adhesives have a limit of 150 grams per liter minus water and exempt compounds. The VOC content of fountain solution is limited to no greater than 80 grams per liter of material, or if a refrigerated chiller is used, no greater than 100 grams per liter of material. Matte finish and metallic inks have VOC content limits, however, the limits apply only at facilities with potential to emit and actual emissions not more than ten tons per year of VOCs. In addition to specific VOC content limits, the operator has a limit on the total quantity of matte finish and metallic coating used each day and each year. If a source does not meet the daily/annual coatings usage or total facility emission requirements for matte finish and metallic coatings, the general coating VOC content limit of 300 gram per liter (less water and exempt compounds) applies to these coatings.

In place of using compliant materials, an operator may utilize a VOC control system. The overall (capture and) control efficiency must be at least 85% for publication gravure and 75% for all other graphic arts operations. An approved emission control system must reduce emissions to a level equal to or lower than that which would have been achieved through use of compliant or meets the applicable overall control efficiency limits, whichever results in lower emissions.

Except as noted in the exemption section, a person is not allowed to sell or specify a graphic arts material with VOC content greater than the VOC content in the rule within the South Coast AQMD boundaries.

District Rule 4607 mirrors the VOC content limits in South Coast AQMD Rule 1130 with a few exceptions – the use metallic inks/matte finish inks in flexo printing. The VOC content limits for matte finish and metallic inks in Rule 4607 apply regardless of the size of the facility. In contrast, the South Coast rule applies only to facilities that are not major sources for VOC. In both rules, use of these specialty inks is limited on a per-day and per-year basis. District Rule 4607 also has an even lower VOC content for flexo metallic ink and matte finish inks for facilities that emit at least ten tons per year of VOCs.

**C. South Coast AQMD Rule 1130.1 (Screen Printing)**

This rule applies to persons performing screen printing operations or who sell, distribute, or require the use of screen printing materials in the South Coast AQMD. South Coast AQMD Rule 1130.1 divides screen-printing operations into several special groups as well as dividing by substrate. The VOC content limits range between 400 and 850 grams VOC per liter, less water and less exempt compounds, as applied. The total usage of high-VOC serigraph inks cannot exceed 10 percent of the total usage of screen printing materials applied on all serigraphs at a facility, on a monthly basis, unless an approved emission control system is used to reduce emissions from high-VOC serigraph inks by an equivalent or greater level to that which would have been achieved by the use of an ink containing 400 grams VOC per liter (less water and exempt compounds).

In lieu of complying with the VOC content limits for graphic arts material, an operator may install and operate a VOC emission control system. If an operator chooses to utilize a VOC emission control system, the control device must destroy at least 95% of the collected vapors and the total emissions from the operation must not exceed the amount of VOC that would have been emitted if the operator had used compliant material. Except as noted in the exemptions, a person cannot specify that an operator use of a material that has a higher VOC content than in the rule nor can a person sell or distribute high-VOC material within the South Coast AQMD.

District Rule 4607 VOC content limits for screen printing operations are equal to or less than the VOC content limits in South Coast AQMD Rule 1130.1. District Rule 4607 limits the VOC content of all screen printing inks and coatings to 400 grams per liter. Adhesives have a limit of 150 grams per liter and resists have a limit of 600 grams per liter. The limits are for the material as applied, less water and exempt compounds. The South Coast rule allows higher VOC content for coatings used in certain specialty markets. District Rule 4607 has a specific overall capture and control efficiency for VOC emission control systems as well as limiting total emissions. If an operator must meet both conditions, it is possible that the emissions from the process would be less than if the operator had used compliant coatings to meet the rule requirements. The South Coast AQMD rule does not have a specific minimum overall capture and control efficiency, although the rule does require 95% destruction of the vapors collected.

**D. South Coast AQMD Rule 1171 (Solvent Cleaning Operations)**

South Coast AQMD has a separate rule for all solvent cleaning. This rule applies to all persons who use solvent materials in solvent cleaning operations during the production, repair, maintenance, or servicing of parts, products, tools, machinery, equipment, or general work areas; all persons who store and dispose of these materials used in solvent cleaning operations; and all solvent suppliers who supply, sell, or offer for sale solvent cleaning materials for use in solvent cleaning operations. For this analysis, the focus will be on those cleaning operations performed by South Coast sources that would be subject to District Rule 4607 if they were located within the District's boundaries.

In South Coast Rule 1171, the VOC content limits applicable to sources similar to District Rule 4607 depend on the equipment to be cleaned and range from 25 grams per liter to 100 grams per liter. In lieu of complying with the VOC content limits, operators may utilize an approved VOC emission control system in association with the solvent-cleaning operation. For graphic arts and screen printing, the collection portion of the control system must collect at least 70% of the emissions generated and the control portion of the system must reduce emissions from the emission collection system by at least 95%. Solvents and cleaning cloths and paper towels should be stored in closed, non-absorbent, non-leaking containers.

South Coast AQMD Rule 1171 does allow certain flexographic operations a slightly higher VOC content for cleaning materials compared to District Rule 4607. The VOC content limits, the control requirements, and the work practices in South Coast Rule 1171 are essentially identical to District Rule 4607 for graphic arts operations because the solvent cleaning portion of Rule 4607 was recently amended to upgrade the rule to reflect best available control technology.

#### **E. Bay Area AQMD Regulation 8 Rule 4 (General Solvent and Surface Coating Operations)**

The purpose of this Rule is to limit emissions of VOCs from the use of solvents and surface coatings in any operation other than those specified by other rules of Regulation 8. The provisions of this Rule apply to operations like model making, printed circuit board manufacturing and assembly, electrical and electronic component manufacturing, surface coating of test panels, training facilities where the application of coating is for training purposes, stencil coatings, low usage coating activities exempt from other Regulation 8 Rules, coatings specifically exempt from other Regulation 8 Rules or solvent usage not specified by other Regulation 8 Rules. Operations that are subject to the requirements of other rules in Regulation 8 are exempt from this rule.

If an operation is subject to Regulation 8 Rule 4, the operator can comply by meeting one of the following requirements:

- Emit no more than 5 tons VOC per year from any source;
- Control emissions with an approved emission control device with an overall capture and control efficiency of 85%. If the control device is an incinerator, the VOC destruction efficiency must be at least 90%; or
- The coating operation uses coating with VOC content of 420 grams per liter, as applied.

To minimize solvent evaporative losses, the Bay Area rule requires work practices in addition to VOC content limits. Solvents used in the cleanup of spray equipment is limited to VOC content of 50 grams per liter unless the atomizing air for the equipment is turned off or a spray gun washer is used. Solvents used for surface preparation are limited to a VOC content of 50 grams per liter. An operator may forego the work practices or use higher VOC-content material if the emissions from the cleaning

operations are controlled by an approved emission control system with overall capture and control efficiency of 85%.

Bay Area AQMD Regulation 8 Rule 4 is a rule for “other” coating sources. As such, it is difficult to compare the Bay Area AQMD rule directly with District Rule 4607. The Bay Area AQMD coating VOC content limit is higher than all coatings in District Rule 4607 except metallic inks, matte finish inks, and screen-printing resists. The Bay Area AQMD rule’s overall capture and control efficiency is generally higher than sources are required to meet in current District Rule 4607. However, the sources that would be subject to Bay Area AQMD’s rule would be small sources and most likely meet the requirements of the rule through total emissions from the facility. District Rule 4607 does not exempt small facilities from the control requirements of the rule, therefore, District Rule 4607 may be more stringent than Bay Area Regulation 8 Rule 4 for certain sources.

#### **F. Bay Area AQMD Regulation 8 Rule 12 (Paper, Fabric, and Film Coating)**

Bay Area AQMD Regulation 8 Rule 12 limits VOC emissions from the application of coatings and adhesives to paper, fabric or films. The rule does not apply to operations subject to Bay Area AQMD Regulation 8 Rule 20. The rule doesn’t apply to any coating line which emits less than 6.5 kg (14.3 pounds) per day. Coatings and adhesive are limited to a VOC content of less than 265 grams per liter of coating applied, excluding water. In lieu of meeting the VOC content limit, the operator may use an approved emission control system that reduces VOC emissions to less than 120 grams per liter of coating applied, excluding water. This equates to approximately 55% overall capture and control efficiency for operators choosing to utilize a VOC emission control system. The Bay Area rule does not have a specific VOC content limit for cleaning materials used for surface preparation and cleanup. Instead, there are work practices that limit VOC emissions in the storage and mixing of VOC-containing materials as well as during solvent cleaning operations.

District Rule 4607 has the same VOC content limits for the coating and adhesive as the Bay Area rule. Compared to the Bay Area AQMD’s 55% overall control efficiency, current District Rule 4607 has a higher overall control efficiency of 90%. District Rule 4607 also incorporates the same work practice as the Bay Area AQMD rule, as well as a few additional work practices related to cleaning with solvents. For example, the District rule includes allowing only certain application techniques for applying the cleaning solvent to minimize evaporations – the Bay Area AQMD does not. In addition to work practices, District Rule 4607 has specific VOC content limits for cleaning materials. An operator can choose to use high-VOC content material for cleaning if the operator has a VOC emission control system that controls emissions from the cleaning operation by at least 90%.

### **G. Bay Area AQMD Regulation 8 Rule 20 (Graphic Arts Printing and Coating Operations)**

The purpose of this Rule is to limit the VOC emissions from graphic arts operations and graphic arts lines. Any facility which emits less than 34 kilograms (175 pounds) of VOC in any month from graphic arts operations is exempt from the rule, except for record-keeping. Laboratory and experimental operations are also exempt from control requirements.

For flexography (flexo), lithography, gravure, and letterpress, the VOC content of coatings and web-splicing adhesive is limited to 300 grams per liter less water as applied. Other adhesives are limited to a VOC content limit of 150 grams per liter, less water as applied. For inks other than flexo ink on a porous substrate, the VOC content limit is 300 grams per liter less water and exempt solvents, as applied. Flexo ink applied to a porous substrate has a VOC content limit of 225 grams per liter (less water and exempt solvents). Fountain solution is limited to 8% VOC. Screen printing inks and coatings are limited to 400 grams per liter less water, as applied. Adhesives used in screen printing operations are limited to 150 grams per liter, less water, as applied.

Solvents used for cleaning are limited to a VOC content of 25 grams per liter to 100 grams per liter, depending on the printing technology and process. In addition to the cleaning product requirements, this rule also has work practices to minimize VOC emissions.

In lieu of complying with the VOC content limits for materials, an operator may install and operate a VOC emission control system. The minimum overall capture and control efficiency is 75% on a mass basis.

For most printing/coating operations, Bay Area AQMD Regulation 8 Rule 20 has VOC content limits that are identical to District Rule 4607. For one screen printing material – screen resists - the Bay Area AQMD rule is silent. District Rule 4607 has a VOC content limit of 600 grams per liter, less water and exempt compounds, as applied. For emission control systems, the Bay Area rule has a lower required control efficiency for certain printing technologies.

The Bay Area AQMD rule and District Rule 4607 incorporate the same VOC content limits for cleaning solvents. District Rule 4607 also incorporates the same work practice as the Bay Area AQMD rule, as well as a few additional work practices related to cleaning with solvents. For example, the District rule includes allowing only certain application techniques for applying the cleaning solvent to minimize evaporations – the Bay Area AQMD does not.

### **H. Sacramento Metropolitan AQMD Rule 450 (Graphic Arts Operations)**

Sac Metro AQMD Rule 450 applies to graphic arts operations and to any screen printing operation at any stationary source regardless of the substrate. The requirement of this

rule, including the VOC limits in Section 301.1 for adhesives, shall also apply to adhesives used by graphic arts operations unless exempt. The cleaning and storage requirements in Section 302 shall apply to all graphic arts operations at any stationary source including those exempt pursuant to Section 110 of this rule. The requirements of Sac Metro Rule 440 (Organic Solvents), does not apply to operations subject to this rule.

The VOC content requirements for inks, coatings, and adhesives does not apply to any graphic arts operation at a stationary source which either has actual VOC emissions of less than or equal to 60 pounds per month from all graphic arts operations and cleaning materials; or receives a permit that limits the potential to emit, to not more than 175 pounds of VOC per month from all graphic arts operations and cleaning materials.

Sac Metro AQMD Rule 450 has the following exemptions:

- Gravure printing operations.
- Business and personal printers.
- Prepress operations, including film photo processors and plate photo processors.
- Aerosol adhesives used by screen printers if the adhesives comply with Sac Metro Rule 460 (Adhesives and Sealants)
- Aerosol adhesives used in graphic arts operations provided that the total VOC emissions from the facility are less than 660 pounds per month

VOC content limits for graphic arts operations that are not screen printing operations are 300 grams VOC per liter for coatings and inks and 150 grams per liter for adhesives. The VOC content limits are less water and less exempt compounds. The VOC content of fountain solution is limited to no greater than 80 grams per liter of material, or if a refrigerated chiller is used, no greater than 100 grams per liter of material. If the fountain solution has a density of 1,000 grams per liter, the 80 grams per liter limit represents about 8% by volume and the 100 grams per liter limit represents about 10% by volume. This rule also mandates a specific temperature for the chilled fountain solution.

For solvent cleaning, Sac Metro AQMD limits composite partial pressure in addition to VOC content for certain cleaning activities and in lieu of VOC content for other cleaning activities. The range of VOC content is 72 to 810 grams per liter. Composite partial pressure ranges from 3 to 33 millimeters mercury at 20 degrees centigrade. To minimize solvent evaporation, operators are required to cover containers of VOC-containing material and to place material in covered containers. Additionally, the total amount of solvent used for lithographic and letter press printing – other cleaning cannot exceed 15% of the total monthly usage of blanket wash cleaning and roller wash cleaning.

In lieu of complying with the VOC content limits for printing materials or for cleaning operations, an operator may use an approved emission control system with capture efficiency of at least 70% and a control device efficiency of at least 95%. This translates to an overall capture and control efficiency of 67%.



A person cannot supply, sell, solicit, or offer for sale, any noncompliant material for use in graphic arts operations. The prohibition applies to any graphic arts material which will be applied at any physical location within the District.

District Rule 4607 mirrors Sac Metro Rule 450 for the VOC content of non-screen printing inks, coatings, and adhesives. These VOC content limits apply to gravure printing operation, which the Sac Metro rule exempts. District rule limits all fountain solutions to a VOC content of 8%. The Sac Metro rule allows a higher VOC content limit for refrigerated/chilled fountain solution. Screen printing inks and coatings in the Sac Metro AQMD rule range from 300 to 800 grams per liter, as applied less water and exempt compounds. District Rule 4607 has a VOC content limit of 400 grams per liter for inks and coatings and 150 grams per liter for adhesives. Sac Metro rule has one screen printing coating that is lower than District Rule 4607 – web -ed wallpaper. District staff is not aware that such operations exist within the District's boundaries. For one screen printing material – screen resists - the Sac Metro AQMD rule is silent – District Rule 4607 has a VOC content limit of 600 grams per liter, less water and exempt compounds, as applied for this material.

Since the Sac Metro AQMD rule allows composite partial pressure as an alternative to VOC content for certain cleaning solvents, it is not possible to compare the solvent cleaning material limits directly. Low vapor pressure material may or may not be high-VOC content. In general, however, District Rule 4607 has lower numeric limits for VOC content – composite vapor pressure is not used. For solvent cleaning, current District Rule 4607 has a VOC content limit range of 25 to 100 grams VOC per liter material beginning in January 2010. This range is lower than the numeric limits in the Sac Metro AQMD rule. District Rule 4607 also incorporates the same work practices as the Sac Metro AQMD rule to minimize solvent evaporation during cleaning operations.

#### **I. Ventura County APCD 74.3 (Paper, Fabric, and Film Coating Operations)**

The provisions of this rule apply to any application process involving the coating of paper, fabric or film. Operators have three ways to comply with the rule:

- Use coating material, as applied, with less than 265 grams ROC per liter coating less water and exempt compounds.
- Emissions from the operation are less than 120 grams per liter coating applied, less water and exempt compounds, on a 24-hour average basis.
- Install and utilize an emission control system that reduces emissions by a combined capture and destruction efficiency of at least 90%.

If the coating applied contains more than 1200 grams of ROC per liter of coating applied, less water and less exempt solvent, then, in addition to the emission control system, emissions are limited to 120 grams of ROC per liter of coating applied, less water and exempt solvent, using a rolling 24 hour average.

Solvent evaporation is minimized through requiring covered, non-leaking containers for solvent-containing materials – a work practice. Solvents used in clean-up are limited to 200 grams ROC per liter material or the operator install and utilize an emission control system that reduces emissions by a combined capture and destruction efficiency of at least 90%.

Current District Rule 4607 VOC content limits for inks and coatings in paper and fabric are identical to the Ventura County APCD VOC content limits. Operators do not have the option of averaging over a 24-hour period to comply with Rule 4607. If an operator uses a VOC emission control system to comply with the rule limits, there is a specific overall capture and control efficiency of at least 86%. Since District Rule 4607 is undergoing amendment, the proposed efficiency will be increased to 90%, which matches the Ventura County APCD combined capture and destruction efficiency.

For solvent cleaning, current District Rule 4607 has a VOC content limit range of 25 to 100 grams VOC per liter material beginning in January 2010. This range is significantly lower than the 200 gram per liter limit in the Ventura County APCD rule. As with the Ventura County APCD rule, operators can use higher VOC content material for cleaning if the operation is within an approved VOC emission control system with an overall capture and control efficiency of at least 86%. This control efficiency will be increased to 90% as part of a rule amendment project. District Rule 4607 also incorporates the same work practice as the Ventura County APCD rule, as well as a few additional work practices related to cleaning with solvents designed to minimize solvent evaporation during cleaning. The public hearing to adopt the amendments to Rule 4607 is expected in December 2008.

#### **J. Ventura County APCD Rule 74.19 (Graphic Arts)**

Ventura County APCD rule applies to any person who applies any ink, coating, adhesive, fountain solution, or solvent containing Reactive Organic Compounds (ROC) as part of a graphic arts operation. The rule also applies to any person in Ventura County who manufactures any ink, coating, adhesive, fountain solution, or solvent containing VOC sold for use in a graphic arts operation in Ventura County. The ROC content limits of Ventura County APCD Rule 74.19 do not apply to any stationary source that emits less than 200 pounds of ROC per year from graphic arts operations.

For sources subject to the Ventura County APCD rule requirements, inks and coatings are limited to a ROC content of 300 grams per liter and adhesives to 150 grams per liter – both limits are less water and exempt compounds. Flexographic inks on porous substrates have a ROC content limit of 225 grams per liter less water and exempt compounds. If the material contains less than 120 grams of solids per liter of material, the ink/coating/adhesive limits are the same, but determined as grams of ROC per liter of material – water and exempt compounds are not subtracted.

The ROC content of fountain solution is limited to no greater than 80 grams per liter of material, or if a refrigerated chiller is used, no greater than 100 grams per liter of

material. If the fountain solution has a density of 1,000 grams per liter, the 80 grams per liter limit represents about 8% by volume and the 100 grams per liter limit represents about 10% by volume.

For solvent cleaning, Ventura County APCD limits composite partial pressure in addition to ROC content for certain cleaning activities and in lieu of ROC content for other cleaning activities. The range of ROC content is 50 to 950 grams per liter. Composite partial pressure ranges from 3 to 33 millimeters mercury at 20 degrees centigrade. Operators are prohibited from using methylene chloride for cleaning purposes. Methylene chloride is usually considered an exempt compound.

District Rule 4607 mirrors the Ventura County APCD rule for inks, coatings, and adhesives for graphic arts operations. Since the Ventura County APCD rule allows composite partial pressure as an alternative to VOC content for certain cleaning solvents, it is not possible to compare the solvent cleaning material limits directly. Low vapor pressure material may or may not be have high-VOC content. In general, however, District Rule 4607 has lower numeric limits for VOC content – composite vapor pressure is not used. For solvent cleaning, current District Rule 4607 has a VOC content limit range of 25 to 100 grams VOC per liter material beginning in January 2010. This range is lower than the numeric limits in the Ventura County APCD rule. As with the Ventura County APCD rule, operators can use higher VOC content material for cleaning if the operation is within an approved VOC emission control system with an overall capture and control efficiency of at least 86%. This control efficiency will be increased to 90% as part of a rule amendment project. District Rule 4607 also incorporates the same work practice as the Ventura County APCD rule, as well as a few additional work practices related to cleaning with solvents designed to minimize solvent evaporation during cleaning. The public hearing to adopt the amendments to Rule 4607 is expected in December 2008.

#### **K. Ventura County APCD Rule 74.19-1 (Screen Printing Operations)**

Ventura County APCD Rule 74.19-1 applies to any person who uses any ink, coating, adhesive, resist, or solvent containing ROC (Reactive Organic Compounds) in a screen printing operation. The rule also applies to any person in the District who manufactures, specifies the use of, sells, or offers for sale any ink, coating, adhesive, resist, or solvent containing ROC for use in a screen printing operation in the Ventura County APCD.

The ROC content limits of Ventura County AQCD Rule 74.19-1 do not apply to any stationary source that emits less than 200 pounds of ROC per year from screen printing operations. Emissions from aerosol products, cold cleaners, vapor degreasers, graphic arts operations used exclusively for research, classroom instruction in schools, laboratory analysis, or determination of product quality and commercial acceptance are not included in the exemption determination.

In addition to the above exemption, screen printing operations used exclusively for research, classroom instruction in schools, laboratory analysis, or determination of

product quality and commercial acceptance are exempt, provided that total ROC emissions are less than 200 pounds per year. The production of electronic circuits is specifically exempt from the ROC limits of the rule. The adhesive ROC limit does not apply to aerosol platen adhesive if the aerosol platen adhesive usage is 150 ounces per month or less.

Screen printing inks, coatings and adhesives are limited to a ROC content of 400 grams per liter; metallic inks and resists are limited to 600 grams per liter; and extreme performance inks and coatings are limited to 800 grams per liter; water slide decals and ceramic decals are limited to 800 grams per liter. These limits are less water and exempt compounds. In lieu of meeting the ROC limits, an operator may install and operate an emission control system with an overall efficiency of at least 75%. Additionally, all drying ovens must be vented to the control system and the incinerator must be continuously monitored.

No one is allowed to sell distribute, or require any other person to use any ROC-containing material subject to the provisions of this rule which, when thinned or reduced according to the manufacturer's recommendation for application and use, does not meet the applicable ROC limits required by this rule for the specific application, except if the person operates an approved emission control system or the facility emissions are less than 200 pounds of ROC per year.

For solvent cleaning, Ventura County APCD limits composite partial pressure in addition to ROC content for certain cleaning activities and in lieu of ROC content for other cleaning activities. The range of ROC content is 200 to 1070 grams per liter. Composite partial pressure ranges from 5 to 25 millimeters mercury at 20 degrees centigrade.

District Rule 4607 limits the VOC content of screen printing inks and coatings to 400 grams per liter. Adhesives have a limit of 150 grams per liter and resists have a limit of 600 grams per liter. The limits are for the material as applied, less water and exempt compounds. The Ventura County rule allows higher VOC content for coatings used in certain specialty markets. As with the Ventura County APCD rule, operators can use higher VOC content material for coating, or printing if the operation is within an approved VOC emission control system with an overall capture and control efficiency of at least 67%. This control efficiency will be increased to 75% as part of a rule amendment project.

Since the Ventura County APCD rule allows composite partial pressure as an alternative to VOC content for certain cleaning solvents, it is not possible to compare the solvent cleaning material limits directly. Low vapor pressure material may or may not be high-VOC content. In general, however, District Rule 4607 has lower numeric limits for VOC content – composite vapor pressure is not used. For solvent cleaning, current District Rule 4607 has a VOC content limit range of 25 to 100 grams VOC per liter material beginning in January 2010. This range is lower than the numeric limits in the Ventura County APCD rule. District Rule 4607 also incorporates the same work

practices as the Ventura County APCD rule to minimize solvent evaporation during cleaning. Operators are also allowed to use high-VOC content material if the cleaning operation is controlled with a VOC emission control system. This allows operators operational flexibility without increasing VOC emissions. The Ventura County APCD rule is silent as to whether operators have this option. The public hearing to adopt the amendments to Rule 4607 is expected in December 2008.

### **Conclusion**

After careful evaluation of federal rules or regulations covering emissions from this source category as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4607 satisfies RACT for graphic arts operations as well as for paper, film, foil and fabric.

## Rule 4610 – Glass Coating Operations

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

(Source: District 2007 Ozone Plan)

### District Rule 4610 Description

The purpose of this rule is to limit the emissions of volatile organic compounds (VOCs) from the coating of glass products.

The following categories of operations are exempt from the rule requirements: (a) touch-up and repair coatings; (b) stencil coatings applied on clear or transparent substrates; (c) manufacturer performance testing of coatings; (d) aerosol coating products.

The rule requires that the VOC contents of coatings applied to glass shall not exceed the following limits: (a) single-component general coating - 2.3 lb/gallon; (b) dual-component general coating - 3.5 lb/gallon; (c) mirror backing applied by curtain coating - 4.2 lb/gallon; (d) mirror backing applied by roll coating - 3.6 lb/gallon; (e) optical coatings - 6.7 lb/gallon; (f) electricity-dissipating and shock-free coatings - 3.0 lb/gallon; and (g) metallic coatings - 3.5 lb/gallon.

The rule restricts coating application methods to electrostatic application, curtain/flow coater, roll coater, dip coater, hand application methods, and high-volume, low-pressure (HVLP) spray.

The rule also provides an option to use an emissions control device in lieu of complying with VOC content limits and coating application methods. Control devices used must have a capture efficiency of at least 90% and a destruction efficiency of at least 95%.

Records of coating operations must be maintained and retained for at least five years. Operators opting to use an emissions control device must maintain records of parameters needed to demonstrate proper operation of the control device.

### How does District Rule 4610 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this category.

**B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this category.

**C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this category.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this category.

**How does District Rule 4610 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4610 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1145 (amended 12/3/2004)
- Bay Area AQMD Regulation 8 Rule 4 (adopted 10/16/2002)
- Sacramento Metro AQMD (no applicable rule)
- Ventura County APCD (no applicable rule)

**A. South Coast AQMD Rule 1145**

The purpose of South Coast AQMD rule 1145, *Plastic, Rubber, Leather, and Glass Coatings*, is to reduce volatile organic compounds (VOC) emissions from the application of coatings to any plastic, rubber, leather, or glass products.

The rule exempts the following categories of operations: (a) touch-up and repair coatings; (b) stencil coatings applied on clear or transparent substrates; (c) manufacturer performance testing of coatings; (d) aerosol coating products, (e) clear or translucent coatings, (f) any individual coating category used in volumes less than 50 gallons in any one year, provided that the total usage of all such coatings does not exceed 200 gallons per year per facility, (g) mask coatings less than 0.5 millimeter thick (dried) if the area coated is less than 25 square inches, (h) mask coatings that are less than 0.5 millimeter thick (dried) and/or the area coated is more than 25 square inches, provided that a written petition that demonstrates compliant coatings are not available is submitted to and written approval is granted by the Executive Officer, (i) EMI/RFI shielding coatings, (j) Heparin-benzalkonium chloride (HBAC)-containing coatings applied to medical devices, provided that the total usage of all such coatings does not exceed 100 gallons per year, per facility, and (k) airbrush operations using 5 gallons or less per year are exempt from application method restrictions.

The rule stipulates that the VOC contents of coatings applied to glass shall not exceed the following limits: (a) single-component general coating – 1.0 lb/gallon; (b) dual-component general coating – 1.0 lb/gallon; (c) mirror backing applied by curtain coating - 4.2 lb/gallon; (d) mirror backing applied by roll coating - 2.6 lb/gallon; (e) optical coatings - 0.4 lb/gallon; (f) electricity-dissipating and shock-free coatings - 3.0 lb/gallon; and (g) metallic coatings - 3.5 lb/gallon.

The rule restricts coating application methods to electrostatic application, curtain/flow coater, roll coater, dip coater, hand application methods, and high-volume, low-pressure (HVLP) spray.

The rule also provides an option to use an emissions control device in lieu of complying with VOC content limits and coating application methods. Control devices used must have a capture efficiency of at least 90% and a destruction efficiency of at least 95%.

The rule requires maintenance of daily or monthly coatings usage activities. Records must be retained for at least two years.

South Coast AQMD Rule 1145 is more stringent than District Rule 4610 in the requirements for VOC contents of glass coatings. Whereas the two rules have similar VOC content limits for three categories of coatings (flow/curtain-coated mirror backing, electricity dissipating and metallic), South Coast AQMD Rule 1145 has more stringent VOC content limits for four categories (one- and two-component general coatings, rolled-on mirror backing, and optical).

There is no significant difference between the two rules under the exemptions; application methods and alternative emissions control methods. South Coast AQMD Rule 1145 includes a longer list of exemptions, but this is probably only because it covers coatings for plastic, rubber, leather and glass while District Rule 4610 addresses only glass coatings.

District Rule 4610 is more stringent in the record keeping requirement because it requires records to be retained for five years, while South Coast AQMD Rule 1145 requires only a two-year retention period.

With the exception of the VOC content limits, the two rules are only slightly different or similar in all comparison categories. South Coast AQMD Rule 1145 has more stringent VOC content limits, and is therefore more stringent than District Rule 4610 overall.

## **B. Bay Area AQMD Regulation 8 Rule 4**

The purpose of Bay Area AQMD Regulation 8 Rule 4, *General Solvent and Surface Coating Operations*, is to limit emissions of volatile organic compounds from the use of solvents and surface coatings in operations other than those covered by other rules of



Regulation 8. Since it is not covered by any other rule under Regulation 8, glass coating falls under rule 4.

Exemptions are provided for aerosol can coatings. No other exemptions pertinent to glass coating are specifically listed.

The rule provides three options for compliance: (a) limit total facility VOC emissions to 5 tons per years; or (b) use a control device with a VOC destruction efficiency of at least 90%, or (c): use coatings with a VOC limit of 3.5 lb/gallon.

The rule requires records of coating activities to be maintained and retained for at least two years.

As far as glass coating is concerned, Bay Area AQMD Regulation 8 Rule 4 provides two avenues of compliance that are less stringent than District Rule 4610: (a) facilities are provided an option to use any coatings, regardless of VOC content, as long as total annual VOC emissions are limited to 5 tons. Facilities of comparable size under District Rule 4610 would still have to comply with VOC content limits or use control devices. (b) facilities opting to use a control device only need to achieve a 90% control efficiency, compared to 95% required by District Rule 4610.

The VOC content limit of 3.5 lb/gallon, which is the third compliance option provided by Bay Area AQMD Regulation 8 Rule 4, is an average value that is fairly comparable to the category-specific VOC limits of District Rule 4610. It is as stringent as two of the Rule 4610 categories, less stringent than another two, and more stringent than a further three categories.

In addition, District Rule 4610 has a more stringent record keeping requirement because it requires records to be retained for five years, compared to the two-year retention period required by Bay Area AQMD Regulation 8 Rule 4.

District Rule 4610 is therefore more stringent than Bay Area AQMD Regulation 8 Rule 4.

### **Conclusion**

After evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4610 meets RACT for Glass Coating Operations.

The rule is more stringent overall than the equivalent Bay Area AQMD rule, but not as stringent overall as the equivalent South Coast AQMD rule. However, since South Coast AQMD rules generally exceed RACT requirements, District Rule 4610 still meets RACT even though it is not as stringent as the corresponding South Coast AQMD rule.

## Rule 4612 - Motor Vehicle and Mobile Equipment Coating Operations

### Emissions Inventory:

Tons per day - summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	2.05	2.10	1.54	1.55	1.57	3.04	1.61	1.63

(Source: District 2007 Ozone Plan)

### District Rule 4612 Description

District Rule 4612, recently amended on September 20, 2007, controls VOC emissions from motor vehicle and mobile equipment coating operations, and from organic solvent cleaning, storage and disposal associated with the coating operations.

This source category includes operations that apply, supply, sell, offers for sale, or solicits the application of VOC-containing coatings used in the finishing or refinishing of Vehicles and Equipment, and their parts and components. This also includes the organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials associated with such coating operations.

District Rule 4612 limits the VOC content limit of coatings used to coat motor vehicles and mobile equipment. In lieu of complying with VOC content limits, operators may operate an APCO-approved VOC emission control system. District Rule 4612 replaced District Rule 4602 on January 1, 2009. District Rule 4612 incorporates all of the elements of the California Air Resources Board's (ARB's) Suggested Control Measures (SCM) for this source category.

### How does District Rule 4612 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

1. [EPA-450/2-76-028 1976/11 Control of Volatile Organic Emissions from Existing Stationary Sources - Volume I: Control Methods for Surface Coating Operations](#)

The CTG applies to surface coating operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas. This CTG will not be compared to District Rule 4612 since the source category (Motor Vehicle and Mobile Equipment Coating) is addressed in another CTG: EPA-450/2-77-008 1977/05 [Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks](#) (See discussion below).

2. [EPA-450/2-77-008 1977/05 Control of Volatile Organic Emissions from Existing Stationary Sources - Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks](#)

The CTG applies to motor vehicle surface coating operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

The table below identifies the CTG requirements and how Rule 4612 compares to the automobile and light-duty truck coating requirements.

Coating Type	CTG (lb/gal)	4612 (lb/gal)
Prime	2.8	2.1
Topcoat	4.2	2.1
Final Repair Topcoat	5.5	2.1

As shown in the table above, District Rule 4612 is more stringent than all CTG limits.

3. [EPA-453/R-08-006 2008/09 Control Techniques Guidelines for Automobile and Light-Duty Truck Assembly Coatings](#)

The CTG applies to vehicle assembly coating operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas. There are no vehicle assembly plants in the District; therefore, this CTG will not be examined.

## **B. EPA - Alternative Control Technology (ACT)**

[EPA-453/R-94-017 1994/02 Alternative Control Techniques Document - Surface Coating of Automotive/Transportation and Business Machine Plastic Parts](#)

The ACT applies to the coating of plastic parts for the automotive industry, business machines, and other miscellaneous plastic parts. The ACT identifies an automotive coating work practice standards, VOC content limits, application methods, and add-on control efficiencies based on California District rules as of 1994. Since SJVAPCD Rule 4612 is at least as stringent overall compared to other Districts (see analysis below in Section III), a detailed evaluation of the ACT is not necessary.

## **C. Standards of Performance for New Stationary Sources (NSPS)**

*40 CFR 60 Subpart MM (Standards of Performance for Automobile and Light Dusty Truck Surface Coating Operations) applies to assembly plant coatings.*

There are no vehicle assembly plants in the District; therefore, this NSPS will not be examined.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

#### *40 CFR 63 Subpart IIII (National Emission Standards for HAPs: Surface Coating of Automobiles and Light-Duty Trucks)*

The requirements in this subpart are not directly comparable to the District Rule 4612 limits. The NESHAP HAP emission limits which are expressed in terms of % HAP, HAP emission concentration, and mass (kg) of HAP per mass (kg) of solids are not directly comparable to the coatings VOC limit which is expressed in terms of grams (or lb) of VOC per liter (or gallons) of coatings, less water and exempt compounds, as applied. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limits versus District Rule 4612 VOC limits.

#### **How does District Rule 4612 compare with state regulations?**

##### *A. California Air Resources Board (CARB) Suggested Control Measures (SCM)*

##### **1. SCM for Automotive Coatings**

The table below identifies the requirements of the SCM:

<b>Rule Comparisons</b> <b>g-VOC/L (lb-VOC/gal)</b>		
<b>Coating Category</b>	<b>SCM</b>	<b>SJ Valley (Rule 4612)</b>
Adhesion Promoter Plastic Parts	540 (4.5)	540 (4.5)
Camouflage		340 (2.8)
Clear Coating	250 (2.1)	250 (2.1)
Color Coating	420 (3.5)	420 (3.5)
Pretreatment	660 (5.5)	660 (5.5)
Precoat		660 (5.5)
Primer	250 (2.1)	250 (2.1)

Primer Sealer	250 (2.1)	250 (2.1)
Primer Surfacer		250 (2.1)
Single Stage Coating (not primer or multicolor)	340 (2.8)	340 (2.8)
Topcoat - General		250 (2.1)
Topcoat - Metallic/Iridescent		420 (3.5)
Topcoat - Metallic/Iridescent (spot repair)		420 (3.5)
Topcoat - Multicolored	680 (5.7)	420 (3.5)
Topcoat - Multistage		340 (2.8)
Topcoat - Multistage (spot repair)		340 (2.8)
Water-Based Temporary Transit		250 (2.1)
Temporary Protective Coating	60 (0.5)	60 (0.5)
Truck Bed Liner	310 (2.6)	310 (2.6)
Underbody Coating	430 (3.6)	430 (3.6)
Uniform Finish Coating	540 (4.5)	540 (4.5)
Other	250 (2.1)	250 (2.1)
<b>Application Methods</b>	<b>SCM</b>	<b>SJ Valley (Rule 4612)</b>
Transfer Efficiency Minimum	65%	65%
<b>Add-on Control Efficiency</b>	<b>SCM</b>	<b>SJ Valley (Rule 4612)</b>
Overall Control	85% by wt	85% by wt and at least equiv to compliant coating emissions
<b>Solvents</b>	<b>SCM</b>	<b>SJ Valley (Rule 4612)</b>
Product Cleaning (General)	25	25
Repair and Maintenance Cleaning	25	25
Cleaning of Application Equipment	25	25

As shown in the table above, the SCM does not contain any requirements more stringent than District Rule 4612. As such, District Rule 4612 is at least as stringent as the SCM.

**How does District Rule 4612 compare to rules in other air districts?**

District staff compared District Rule 4612 with the rules of other California ozone nonattainment air districts' rules (listed below) auto coating operations. The results of the analysis are discussed below.

- South Coast Air Quality Management District (SCAQMD) Rule 1151 - Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations (Amended December 2, 2005)
- Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 45 - Motor Vehicle and Mobile Equipment Coating Operations (Amended January 6, 1999)
- Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 459 - Automotive, Truck and Heavy Equipment Refinishing Operations) (Amended October 2, 1997)
- Ventura County Air Pollution Control District (VCPCD) Rule 74.18 - Motor Vehicle and Mobile Equipment Coating Operations (Amended September 10, 1996)

<b>Rule Comparisons g-VOC/L (lb-VOC/gal)</b>					
<b>Coating Category</b>	<b>Bay Area (Rule 8-45)</b>	<b>South Coast (Rule 1151)</b>	<b>Sac Metro (Rule 459)</b>	<b>Ventura (Rule 74.18)</b>	<b>SJ Valley (Rule 4612)</b>
Adhesion Promoter Plastic Parts					540 (4.5)
Camouflage	420 (3.5)		420 (3.5)	420 (3.5)	340 (2.8)
Clear Coating					250 (2.1)
Color Coating	540 (4.5)	685 (5.7)			420 (3.5)
Pretreatment	780 (6.5)	750 (6.5)	780 (6.5)	780 (6.5)	660 (5.5)
Precoat	580 (4.8)		600 (5.0)		660 (5.5)
Primer			250 (2.1)	250 (2.1)	250 (2.1)
Primer Sealer	340 (2.8)	340 (2.8)	420 (3.5)	340 (2.8)	250 (2.1)
Primer Surfacer		250 (2.1)	250 (2.1)	250 (2.1)	250 (2.1)
Single Stage Coating (not primer or multicolor)					340 (2.8)
Topcoat - General	420 (3.5)	340 (2.8)	420 (3.5)	340 (2.8)	250 (2.1)
Topcoat - Metallic/Iridescent	520 (4.3)	340 (2.8)	520 (4.3)	520 (4.3)	420 (3.5)
Topcoat - Metallic/Iridescent (spot repair)		420 (3.5)			420 (3.5)
Topcoat - Multicolored	540 (4.5)	685 (5.7)			420 (3.5)
Topcoat - Multistage		340 (2.8)	540 (4.5)	340 (2.8)	340 (2.8)
Topcoat - Multistage (spot repair)		420 (3.5)			340 (2.8)
Water-Based Temporary Transit				420 (3.5)	250 (2.1)

Temporary Protective Coating	60 (0.5)		60 (0.5)		60 (0.5)
Truck Bed Liner					310 (2.6)
Underbody Coating			540 (4.5)		430 (3.6)
Uniform Finish Coating					540 (4.5)
Other					250 (2.1)
<b>Application Methods</b>	<b>Bay Area (Rule 8-45)</b>	<b>South Coast (Rule 1151)</b>	<b>Sac Metro (Rule 459)</b>	<b>Ventura (Rule 74.18)</b>	<b>SJ Valley (Rule 4612)</b>
LVLSP Spray			x		
Transfer Efficiency Minimum	65%	65%	APCO/EPA approved	65%	65%
<b>Add-on Control Efficiency</b>	<b>Bay Area (Rule 8-45)</b>	<b>South Coast (Rule 1151)</b>	<b>Sac Metro (Rule 459)</b>	<b>Ventura (Rule 74.18)</b>	<b>SJ Valley (Rule 4612)</b>
Control	85%				
Overall Control	Equiv to compliant coating emissions	Equiv to compliant coating emissions	85%	85% by wt	85% by wt and Equiv to compliant coating emissions
<b>Solvents</b>	<b>Bay Area (Rule 8-45)</b>	<b>South Coast (Rule 1171)*</b>	<b>Sac Metro (Rule 459)</b>	<b>Ventura (Rule 74.18)</b>	<b>SJ Valley (Rule 4612)</b>
Product Cleaning (General)	72 (0.6)	25	72 (0.6)	200	25
Repair and Maintenance Cleaning		25	72 (0.6)	200	25
Cleaning of Application Equipment		25	72 (0.6)	200	25

\*Per Rule 1171 (Solvent Cleaning)

As shown in the table above, SJVAPCD Rule 4612 is as stringent or more stringent than other District in all categories except for two categories (precoat and Topcoat - Metallic/Iridescent). Since the overwhelmingly majority of coating categories are as stringent or more stringent than other Districts, Overall SJVAPCD Rule 4612 is at least as stringent as Bay Area Rule 8-45, South Coast Rule 1151, Sac Metro Rule 459, and Ventura Rule 74.18.

## **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4612 satisfies RACT for motor vehicle and mobile equipment coating operations.



## Rule 4621 – Gasoline Transfer Into Stationary Storage Containers, Delivery Vessels, and Bulk Plants

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NO <sub>x</sub>	0.019	0.021	0.023	0.023	0.024	0.027	0.028	0.03
VOC	3.4	3.6	3.7	3.8	4.1	4.2	4.4	4.5

(Source: District 2007 Ozone Plan)

The emission inventory shown is the combined inventory for District Rule 4621, *Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants*, and Rule 4624, *Transfer of Organic Liquid*.

### District Rule 4621 Description

This rule includes all operations that transfer gasoline between delivery vessels and storage containers and loading racks that are used to load organic liquids with a TVP of 1.5 psia or greater. The purpose of this rule is to limit VOC emissions from stationary storage containers, delivery vessels, and bulk plants.

### How does District Rule 4621 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

1. *EPA-450/2-77-026 Guideline for Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals*

This CTG is related to the control of volatile organic compounds (VOC) from tank truck terminals with daily throughputs of greater than 76,000 liters of gasoline. District Rule 4621 applies to all operations that transfer gasoline between delivery vessels and storage containers and loading racks that are used to load organic liquids with a TVP of 1.5 psia or greater. Since this CTG only applies to the loading of tank trucks, only the sections of District Rule 4621 that apply to tank truck loading will be evaluated.

This CTG identifies RACT for the control of VOCs from tank truck gasoline loading terminals as having an emission limit of 80 mg-hydrocarbon/L-gasoline loaded. District Rule 4621 requires that the VOC emissions from the transfer of gasoline from a stationary storage tank to a gasoline tank truck shall be controlled by 95%. The CTG lists the emission factor for hydrocarbon emissions generated during submerged fill (top or bottom) gasoline loading operations is 600 mg/liter transferred. Therefore, District Rule 4621 emission limit can be calculated as 30 mg/liter (600 mg/liter \* (1 – 0.95)).

Since this emission limit is lower than the one listed in the CTG as RACT, District Rule 4621 satisfies RACT for this CTG.

2. *EPA-450/2-77-035 Guideline for Control of Volatile Organic Emissions from Bulk Gasoline Plants*

This CTG outlines the design of control devices to control vapors from the loading and unloading activities at a gasoline bulk plant. The CTG discusses the effective control of VOC emissions with the installation of submerged fill pipes and vapor control systems. District Rule 4621 requires that all bulk plants shall be equipped with an ARB certified vapor recovery system for the loading racks. In addition, District Rule 4621 also describes inspection procedures to verify that the operation is operating leak free. The requirements in District Rule 4621 are equivalent to the control technology discussed in this CTG.

3. *EPA-450/2-78-051 Guideline for Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems*

This guideline is related to the control of volatile organic compounds (VOC) from gasoline tank trucks and vapor collection systems at bulk terminals, bulk plants, and service stations. The intent of this guideline is to define leak tight conditions and related test procedures for vapor collection systems and tank trucks while loading and unloading at these facilities. Since this CTG only applies to the definition of a leak, only the definition of a leak from District Rule 4621 will be evaluated. In addition, the District does not regulate the emissions from gasoline tank trucks.

The CTG requires that vapor collection systems during loading or unloading operations at service stations, bulk plants and bulk terminals, there shall be no reading greater than or equal to 100 percent of the lower explosive limit (LEL, measured as propane) at 2.5 centimeters around the perimeter of a potential leak source as detected by a combustible gas detector. In addition, there are to be no avoidable visible leaks. District Rule 4621 requires that, for delivery vessels, leak emissions shall not exceed the dripping of VOC-containing liquid at a rate of more than three drops per minute, or a reading of greater than 100 percent of the lower explosive limit (21,000 ppm measured as equivalent propane). Both of the regulations limit leaks to equal to or lower than 100 percent LEL, therefore these requirements are equivalent.

The CTG also requires the vapor collection and vapor processing equipment must be designed and operated to prevent gauge pressure in the tank truck from exceeding 4500 pascals (18 inches of water) and prevent vacuum from exceeding 1500 pascals (6 inches of water). District Rule 4621 only addresses the transfer of gasoline into tank trucks from bulk plants. District Rule 4621 states that the loading rack vapor recovery system shall not create a back pressure in excess of the pressure limits of the delivery vessel certification leak test (18 inches water column). Since both of these regulations have the same back pressure limit these two regulations are equivalent.

Bulk terminal, bulk plant and service station owners or operators must keep records for two years indicating the last time a vapor collection facility passed the required leak testing. District Rule 4621 requires that bulk plants and loading racks keep records of all inspections and all actions conducted on any part of the storage container or loading racks shall be maintained in chronological order showing date of inspection, description and location of any equipment replaced, and a description of the problem which required repair. In addition, all bulk plants are required to maintain daily gasoline throughput records. District Rule 4621 also requires that all records required to demonstrate compliance with the requirements of this rule shall be retained on the premises for a minimum of five years. Therefore the recordkeeping requirements of District Rule 4621 are more stringent than the CTG.

As demonstrated in the discussions above, District Rule 4621 is equivalent to or more stringent than the similar requirements from the CTG.

#### **B. EPA – Alternative Control Technology (ACT)**

1. *EPA-450/R-75-102 Alternative Control Technology Document for Stage I Vapor Control Systems on Gasoline Service Stations*

This document outlines the design of Phase I vapor control systems for facilities that are required to install such systems. CARB now publishes Executive Orders which details the specific equipment needed for certain vapor recovery systems to meet certain Executive Orders. The ACT also states that EPA requires vapor control systems control 90% of the vapors from the Phase I side of a gasoline dispensing operation. Currently District Rule 4621 requires 98% vapor control from the Phase I vapor control system for underground tanks.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP for this source category.

#### **How does District Rule 4621 compare to rules in other air districts?**

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4621 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 461, as amended March 2008
- Bay Area AQMD Regulation 8 Rule 7, as adopted November 2002

- Bay Area AQMD Regulation 8 Rule 39, as adopted June 1994
- Sacramento Metro AQMD Rule 448, as amended February 1995
- Ventura County APCD Rule 70, as amended July 2004

#### **A. South Coast AQMD Rule 461**

South Coast AQMD Rule 461 (Gasoline Transfer and Dispensing) applies to the transfer of gasoline from any tank truck, trailer, or railroad tank car into any stationary storage tank or mobile fueler (Phase I), and from any stationary storage tank or mobile fueler into any mobile fueler or motor vehicle fuel tank (Phase II). District Rule 4621 only applies to storage containers located at bulk plants with capacities greater than 250 gallons and less than 19,800 gallons; to other stationary storage containers with capacities greater than 250 gallons; and to those storage containers that are not subject to the control requirements of Rule 4623 (Storage of Organic Liquids) Section 5.0. The rule also applies to gasoline delivery vessels. Since District Rule 4621 only applies to the Phase I side of gasoline transferring, District Rule 4621 will only be compared to the gasoline Phase I requirements of SCAQMD Rule 461.

SCAQMD Rule 461 requires underground storage tanks to be equipped with a "CARB certified" enhanced vapor recovery system having a minimum volumetric efficiency of 98% and aboveground storage tanks to be equipped with a "CARB certified" vapor recovery system having a minimum volumetric efficiency of 95%. The rule also states that the vapor recovery systems are required to be maintained and operated according to the manufacturer's specifications and the applicable CARB Executive Orders. District Rule 4621 contains the same vapor recovery requirements for underground and aboveground tanks.

SCAQMD Rule 461 requires mobile fueler tanks to be equipped with a "CARB certified" vapor recovery system having a minimum volumetric efficiency of 95% and to maintained and operated the vapor recovery system according to the manufacturer's specifications and the applicable CARB Executive Orders.

#### **B. Bay Area AQMD Regulation 8 Rule 7**

Bay Area AQMD Regulation 8 Rule 7 (Gasoline Dispensing Facilities) applies to both the Phase I and Phase II side of gasoline dispensing facilities. Since District Rule 4621 only applies to the Phase I side of gasoline transferring, District Rule 4621 will only be compared to the gasoline Phase I requirements of Bay Area AQMD Regulation 8 Rule 7.

BAAQMD Reg 8 Rule 7 exempts storage tanks with capacities less than 250 gallons, storage tanks with capacities less than 550 gallons that are used primarily for the fueling of implements of husbandry and that have a submerged fill pipe, and storage tanks installed before January 1, 1999 where the APCO determines that Phase I vapor recovery is not feasible. District Rule 4621 contains the same exemptions based on the storage tanks capacities, but also exempts specific types of storage tanks that were in

operation prior to July 1, 1975. Therefore, the applicability of these two rules can be considered equivalent.

BAAQMD Reg 8 Rule 7 requires gasoline storage tanks to be equipped with a CARB certified Phase I vapor recovery system. This vapor recovery system is required to be maintained and operated according to the manufacturer's specifications and the applicable CARB Executive Order. In addition, this rule states that no person shall install or modify a Phase I vapor recovery system unless the system vapor recovery rate is 98% or the highest vapor recovery rate specified by CARB if the highest rate is less than 98%. District Rule 4621 contains the same vapor recovery requirements for gasoline storage tanks therefore the vapor recovery requirements of these rules are equivalent.

BAAQMD Reg 8 Rule 7 and District Rule 4621 have the same monitoring and testing requirements, however BAAQMD Reg 8 Rule 7 only requires the facility to maintain records for 2 years while District Rule 4621 requires that records be kept for 5 years.

### **C. Bay Area AQMD Regulation 8 Rule 39**

Bay Area AQMD Regulation 8 Rule 39 (Gasoline Bulk Plant and Gasoline Delivery Vehicles) applies to gasoline transfer operations at gasoline bulk plants and delivery vehicles. Since BAAQMD Regulation 8 Rule 39 only applies to bulk plants and delivery vessels, only the bulk plant and delivery vessel requirements District Rule 4621 will be compared to the requirements of BAAQMD Regulation 8 Rule 39.

BAAQMD Regulation 8 Rule 39 states that a person shall not load or permit the loading of gasoline into or out of a gasoline bulk plant unless a CARB certified vapor recovery system is properly connected and used. In addition, BAAQMD Regulation 8 Rule 39 states that the loading rack vapor recovery system shall be maintained and operated in a manner that prevents gauge pressure in the delivery tank from exceeding 46cm (18 in.) of water column during product loading. District Rule 4621 contains the same vapor recovery requirements for bulk plants; therefore the bulk plant vapor recovery requirements of these rules are equivalent.

BAAQMD Regulation 8 Rule 39 states the following requirements for delivery vessels:

- A person shall not operate, or allow the operation of, a gasoline delivery vehicle unless valid State of California decals, as required by Section 41962 of the Health and Safety Code which attest to the vapor integrity of the tank, are displayed.
- Any gasoline delivery vehicle loading at a facility subject to the requirements of Section 8-33-302 shall be equipped with and use a vapor recovery system.
- A person shall not purge gasoline vapor from the tank of a delivery vehicle to the atmosphere.

District Rule 4621 contains the same vapor recovery requirements for delivery vessels; therefore the delivery vessel vapor recovery requirements of these rules are equivalent.

**D. Sacramento Metro AQMD Rule 448**

Sacramento Metro AQMD Rule 448 (Gasoline Transfer Into Stationary Source Containers) applies to operations where gasoline is transferred to stationary storage containers. Since Sacramento Metro AQMD Rule 448 only applies to transferring of gasoline to stationary storage tanks, only these requirements from District Rule 4621 will be compared to the requirements of Sacramento Metro AQMD Rule 448. Both rules also do not apply to tanks with capacities less than 250 gallons equipped with a submerged fill pipe.

Sacramento Metro AQMD Rule 448 requires gasoline storage tanks to be equipped with a CARB certified vapor recovery system. This vapor recovery system is required to be maintained and operated according to the manufacturer's specifications and the applicable CARB Executive Order. In addition, this rule states that the vapor recovery system shall prevent emission to the atmosphere of at least 95%, by weight, of the gasoline vapors displaced from the storage container during the transfer of gasoline into the container. District Rule 4621 requires the vapor recovery system to have a minimum volumetric control efficiency of 98%. Therefore the vapor recovery requirements of District Rule 4621 are more stringent than that of Sacramento Metro AQMD Rule 448.

Sacramento Metro AQMD Rule 448 requires that delivery vessels shall be maintained leak free and a vapor tight. In addition, this rule also prohibits any person from purging gasoline vapors, gases, or hydrocarbon vapors from a delivery vessel to the atmosphere. District Rule 4621 has the same requirements for delivery vessels; therefore the delivery vessel requirements for both rules are equivalent.

District Rule 4621 requires the same monitoring and testing requirements as Sacramento Metro AQMD Rule 448.

**E. Ventura County APCD Rule 70**

Ventura County APCD Rule 70 (Storage and Transfer of Gasoline) applies to operations where gasoline is transferred and to storage operations with gasoline containers less than 40,000 gallons. Since District Rule 4621 only applies to the Phase I side of gasoline transferring. Both rules have exemptions in place for storage tanks with capacities of 250 gallons or less, however Ventura County APCD contains other exemptions in excess of what District Rule 4621 exempts. Therefore District Rule 4621 is applicable to more types of operations. District Rule 4621 will only be compared to the gasoline Phase I requirements of Ventura County APCD Rule 70.

Ventura County APCD Rule 70 requires gasoline storage tanks to be equipped with a CARB certified vapor recovery system. This vapor recovery system is required to be

maintained and operated according to the manufacturer's specifications and the applicable CARB Executive Order. In addition, this rule states that the vapor recovery system shall prevent emission to the atmosphere of at least 95% of the gasoline vapors displaced from the storage container during the transfer of gasoline into the container. District Rule 4621 requires the vapor recovery system to have a minimum volumetric control efficiency of 98%. For bulk plants, both Ventura County APCD Rule 70 and District Rule 4621 require that the loading racks are equipped with an ARB certified vapor recovery system. Therefore the vapor recovery requirements of District Rule 4621 are more stringent than that of Ventura County APCD Rule 70.

Ventura County APCD Rule 70 requires that delivery vessels shall only load and unload at facilities with CARB certified vapor recovery systems. In addition, both rules have the same requirements when opening the hatch to perform a visual inspection. District Rule 4621 has the same requirements for delivery vessels; therefore the delivery vessel requirements for both rules are equivalent.

Ventura County APCD Rule 70 and District Rule 4621 have the same monitoring and testing requirements, however Ventura County APCD Rule 70 only requires the facility to maintain records for 2 years while District Rule 4621 requires that records be kept for 5 years.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4621 satisfies RACT for gasoline transfer into stationary storage containers, delivery vessels, and bulk plants.

## Rule 4622 – Gasoline Transfer into Motor Vehicle Fuel Tanks

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	2.7	2.8	2.9	3.0	3.3	3.4	3.6	3.6

(Source: District 2007 Ozone Plan)

### District Rule 4622 Description

Rule 4622, recently amended on December 20, 2007, limits VOC emissions from the transfer of gasoline into motor vehicle fuel tanks. The main rule requirement is that gasoline dispensing units used to transfer gasoline from a stationary source to a motor vehicle tank must be equipped with a ARB certified Phase II vapor recovery system.

On May 30, 2007 EPA took direct final action to approve revisions to the San Joaquin Valley Unified Air Pollution Control District portion of the California State Implementation Plan. These revisions included approval of District Rule 4622. EPA, in evaluating and approving Rule 4622 included the following:

“We believe these rules are consistent with the relevant policy and guidance regarding enforceability, RACT, BACM, and SIP relaxations.” (*CFR Volume 72, Number 103*)

Since Rule 4622 was recently approved by EPA as meeting RACT requirements, the District did not pursue a detailed RACT analysis.

### How does District Rule 4622 compare with federal rules and regulations?

The District did not conduct a detailed analysis of federal rules and regulations for Rule 4622.

### How does District Rule 4622 compare to rules in other air districts?

The District did not conduct a detailed comparison to rules in other air districts for Rule 4622.

### Conclusion

District staff concludes that District Rule 4622 satisfies RACT for the transfer of gasoline into motor vehicle fuel tanks.



## Rule 4623 – Storage of Organic Liquids

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.107	0.109	0.109	0.109	0.11	0.12	0.12	0.107

(Source: District 2007 Ozone Plan)

### District Rule 4623 Description

District Rule 4623, recently amended on May 19, 2005, regulates VOC emissions from tanks that store organic liquids if the tank capacity is 1,100 or greater and the true vapor pressure (TVP) of the stored liquid is 0.5 psia or greater. Current VOC controls require pressure-vacuum relief valves, internal floating roof tanks, external floating roof tanks, fixed roof tanks with vapor recovery system of at least 95% control efficiency, or pressure vessels. Specific control requirements vary depending on the tank capacity and TVP of the stored liquid. Different tank control requirements are specified for tanks operated by small producers or by non-small producers. Leak detection and repair (LDAR) provisions include periodic inspection and repair of leaking components within a specified time frame. The component leak standard is 10,000 ppmv.

On May 30, 2007 EPA took direct final action to approve revisions to the San Joaquin Valley Unified Air Pollution Control District portion of the California State Implementation Plan. These revisions included approval of District Rule 4623. EPA, in evaluating and approving Rule 4623 included the following:

“We believe these rules are consistent with the relevant policy and guidance regarding enforceability, RACT, BACM, and SIP relaxations.” (*CFR Volume 72, Number 103*)

Since Rule 4623 was recently approved by EPA as meeting RACT requirements, the District did not pursue a detailed RACT analysis.

### How does District Rule 4623 compare with federal rules and regulations?

The District did not conduct a detailed analysis of federal rules and regulations for Rule 4623.

### How does District Rule 4623 compare to rules in other air districts?

The District did not conduct a detailed comparison to rules in other air districts for Rule 4623.

**Conclusion**

District staff concludes that District Rule 4623 satisfies RACT for Storage of Organic Liquids.

## Rule 4624 – Transfer of Organic Liquid

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0.019	0.021	0.023	0.023	0.024	0.027	0.028	0.03
VOC	3.4	3.6	3.7	3.8	4.1	4.2	4.4	4.5

The emission inventory shown is the combined inventory for District Rule 4621, *Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants*, and Rule 4624, *Transfer of Organic Liquid*.

### District Rule 4624 Description

The purpose of this rule is to limit VOC emissions from the transfer of organic liquids, which are liquids that contain VOCs and have a True Vapor Pressure (TVP) of 1.5 psia or greater at the storage container's maximum organic liquid storage temperature.

The rule exempts the following categories: (a) transfer of less than 4,000 gallons of organic liquids per day; (b) gasoline stations – which are covered by District rules 4621 and 4622; (c) transfer operations using vacuum trucks; (d) equipment or components subject to District rules 4409 (Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities), 4455 (Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants), or 4623 (Storage of Organic Liquids) are exempt from leak inspection requirements of Rule 4624, and (e) bottom loading is not required for facilities handling only liquefied petroleum gas.

Facilities transferring 20,000 gallons or more per day of organic liquid must comply with a VOC emission limit of 0.08 lb per 1,000 gallons, use bottom loading, and route VOC vapors to a vapor collection and control system, a fixed roof container, a floating roof container, a pressure vessel, or other closed VOC emission control system.

Facilities transferring less than 20,000 gallons per day of organic liquid must capture at least 95% of VOC vapors displaced during loading, use bottom loading, and route VOC vapors to a vapor collection and control system, a fixed roof container, a floating roof container, a pressure vessel, or other closed VOC emission control system.

Pressure in the delivery tank being loaded must be maintained within the range of 18 inches water column pressure and six (6) inches water column vacuum. Delivery tanks which previously contained organic liquids shall be filled only at transfer facilities that are compliant with the vapor capture requirements. Transfer racks and vapor collection equipment shall have no leaks and no excess organic liquid drainage at disconnections. New top loading facilities or the expansions of any existing one are prohibited.

Quarterly inspection for leaks is required. A facility may apply to reduce inspection frequency to annual after passing five quarterly inspections. Leaking equipment must be repaired or taken out of service within 72 hours.

In addition to an initial source test, VOC control systems must be source tested every 5 years.

Record keeping is required for organic liquid daily throughput and TVP for facilities exempt based on throughput or TVP, daily throughput and leak inspection records for affected facilities. Vacuum truck operators claiming exemption must submit, on a one-time basis, records showing number of vacuum trucks in operation, capacity of each vacuum truck storage container, average monthly throughput per vehicle, type of organic liquid transferred, and VOC capture and control equipment utilized.

Records must be retained for a minimum of five years.

### **How does District Rule 4624 compare with federal rules and regulations?**

#### **A. EPA – Control Technique Guidelines (CTG)**

*Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals.*

This CTG applies to facilities with a throughput of more than 20,000 gallons per day. The CTG states that the recommended loading terminal emission limit that can be achieved through the application of reasonably available control technology (RACT) is 0.64 lb VOC per 1,000 gallons of gasoline loaded.

District Rule 4624 is more stringent than this CTG because it requires a VOC emission limit of 0.08 lb per 1,000 gallons for facilities with a throughput of 20,000 gallons or more, compared to the CTG's recommended limit of 0.64 lb per 1,000 gallons.

#### **B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

*40 CFR 60 Subpart XX, Standards of Performance for Bulk Gasoline Terminals*

This NSPS applies to facilities with a throughput of more than 19,984 gallons per day (75,700 liters per day), and requires the use of a vapor collection system with VOC emissions to the atmosphere not exceeding 0.28 lb/1,000 gallons (35 milligrams/ liter). The VOC emission limit for vapor collection systems at existing (pre-December 17, 1980) facilities is 0.64 lb/1,000 gallons (80 milligrams/liter). The vapor collection system shall be designed to prevent vapors collected at one loading rack from passing to

another loading rack, and only vapor-tight gasoline tank trucks shall be loaded. The operator shall obtain the vapor tightness documentation for trucks to be loaded. Tank numbers are to be recorded during loading and subsequently cross-checked with filed vapor tightness documentation. If the cross-checking reveals that a non-vapor tight tank was loaded, the operator must notify the tank owner and ensure that the tank is not reloaded at that facility until vapor tightness documentation is obtained.

The NSPS also requires that the vapor collection and liquid loading equipment is designed and operated to prevent gauge pressure in the delivery tank from exceeding 4,500 Pascals (450 mm of water) during product loading. Monthly inspection for leaks is required.

Records must be maintained for tank truck vapor tightness documentation, leak inspections, and component additions or replacements. Record must be retained for at least two years.

District Rule 4624 is more stringent than 40 CFR 60 Subpart XX because it applies to loading racks at all terminals, whereas 40 CFR 60 Subpart XX applies only to racks at facilities with a throughput exceeding 19,984 gallons per day.

District Rule 4624 is more stringent than 40 CFR 60 Subpart XX because it requires a VOC emission limit of 0.08 lb/1,000 gallons, whereas 40 CFR 60 Subpart XX allows the much lower limits of 0.28 lb/1,000 gallons for new facilities and 0.64 lb/1,000 gallons for existing facilities.

There are no significant differences between District Rule 4624 and 40 CFR 60 Subpart XX for source testing, monitoring and reporting requirements.

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas 40 CFR 60 Subpart XX requires only 2 years for record retention.

The preceding comparison demonstrates that District Rule 4624 is more stringent than 40 CFR 60 Subpart XX.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

*40 CFR 63 Subpart EEEE, Organic Liquids Distribution (Non-Gasoline)*

This NESHAP applies to various equipment and components used in organic liquids distribution, including loading racks.

The NESHAP requires that vapors displaced during loading (1) be routed through a closed vent system into any combination of control devices achieving at least 98 weight-percent HAP reduction, or a reduction to an exhaust concentration less than or equal to

20 ppmv (control devices must meet applicable testing, monitoring and operating standards depending on type of device); (2) be routed into fuel gas systems or back into a process; or (3) captured in a vapor balancing system that routes organic HAP vapors to the storage tank from which the liquid being loaded originated or to another storage tank connected to a common header.

The requirements of District Rule 4624 and 40 CFR 63 Subpart EEEE are similar as far as the collection and disposal of vapors displaced during organic liquid loading is concerned. However, it is possible to compare destruction efficiencies of the control equipment directly, because District Rule 4624 addresses only VOC (requiring a destruction efficiency of 95%), while 40 CFR 63 Subpart EEEE addresses HAPs (requiring a destruction efficiency of 98%).

In addition, the District implements 40 CFR 63 Subpart EEEE by reference under District Rule 4002.

### **How does District Rule 4624 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4624 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 462 (amended 5/14/1999)
- South Coast AQMD Rule 1142 (adopted 7/19/1991)
- Bay Area AQMD Regulation 8 Rule 6 (amended 2/2/1994)
- Bay Area AQMD Regulation 8 Rule 33 (amended 6/1/1994)
- Bay Area AQMD Regulation 8 Rule 39 (amended 6/1/1994)
- Ventura County APCD Rule 70 (revised 11/11/2003)
- Ventura County APCD Rule 71.3 (revised 6/16/1992)
- Sacramento Metro AQMD Rule 447 (revised 4/2/1998)

#### **A. South Coast AQMD Rule 462**

The purpose of South Coast AQMD Rule 462 is to control emissions of volatile organic compounds (VOC) from facilities that load organic liquids with a vapor pressure of 1.5 psia. The rule provides an exemption from the vapor recovery system and associated continuous monitoring system for facilities that vent loading vapors to a flare or combustion device.

The rule requires loading of organic liquids at facilities with a throughput of 20,000 gallons or more to be done only using a CARB vapor recovery or vapor disposal system, or equivalent system approved by the air District. The vapor recovery/disposal system shall be equipped with a continuous monitoring system, and must reduce the emissions of VOCs to 0.08 lb/1,000 gallons of organic liquid transferred. Only bottom loading is to be used, and there shall be no overfills or leaks. The backpressure in the

vapor recovery and/or disposal system shall not exceed 18 inches of water column pressure.

For facilities with a throughput of less than 20,000 gallons, the vapor recovery/disposal system must reduce VOC emissions by at least 90%. Only bottom loading is to be used, and there shall be no overfills or leaks. The backpressure in the vapor recovery and/or disposal system shall not exceed 18 inches of water column pressure.

For facilities with a throughput of less than 4,000 gallons per day and less than 500,000 gallons per year no vapor recovery/disposal system is required. Only bottom loading is to be used, and there shall be no overfills or leaks

Uncontrolled switch loading is prohibited except only at those facilities with a throughput of less than 4,000 gallons/day and less than 500,000 gallons/yr.

Monthly leak inspection is required if the inspection is to be done by sight, sounds and smell. If an organic vapor analyzer is used, the inspection may be done quarterly.

Required records include (1) daily and year-to-date throughput records (2) inspection records. Records are required to be retained for two years.

South Coast AQMD Rule 462 is slightly more stringent under this category. Whereas District Rule 4624 has no requirements at all for facilities with a throughput of less than 4,000 gallons a day (equivalent to an annual throughput of around 1,460,000 gallons), South Coast AQMD Rule 462 imposes vapor recovery requirements on such facilities if they exceed 500,000 gallons per year. South Coast Rule 462 also requires bottom loading for facilities that are below 4,000 gallons per day and 500,000 gallons per year in throughput.

Both rules have similar requirements for facilities with organic liquid throughputs of 20,000 gallons per day or more. For facilities between 4,000 and 20,000 gallons per day in throughput, District Rule 4624 is more stringent because it requires the vapor recovery system for such facilities to reduce VOC emissions by at least 95%, whereas South Coast AQMD Rule 462 requires a 90% reduction. For facilities with less than 4,000 gallons per day in throughput, South Coast AQMD Rule 462 is more stringent because it requires vapor recovery and/or bottom loading, depending on annual throughput, whereas District Rule 4624 has no requirements.

South Coast AQMD Rule 462 is more stringent for source testing and monitoring because it requires more frequent inspections (monthly for sight/smell/sound method, and quarterly for analyzer). District Rule 4624 requires quarterly inspection and has a provision for reducing the frequency further to annual inspection.

In addition, South Coast AQMD Rule 462 is more stringent under monitoring because it requires the installation and use of a continuous monitoring system for the vapor recovery system.

There is no significant difference between the two rules for reporting. District Rule 4624 is more stringent for recordkeeping because it requires records to be retained for at least 5 years, whereas South Coast AQMD Rule 462 has a two-year record retention requirement.

South Coast AQMD Rule 462's requirement of a continuous monitoring system for vapor recovery systems represents a standard that is more stringent than District Rule 4624. A cost effectiveness analysis is required to determine if such a requirement should be incorporated into District Rule 4624. However, there is no data that can be used to determine the emission reductions attributable to a continuous monitoring system. It is therefore recommended that the continuous monitoring requirement is considered under the context of a rule amendment or rule making process which allows for detailed studies to determine factors such as emission reductions, feasibility, economic and socio-economic costs.

## **B. South Coast AQMD Rule 1142**

South Coast AQMD Rule 1142 applies to the loading of organic liquids into marine vessels, among other operations. The rule requires emissions of VOCs to be limited to 0.05 lb/1,000 gallons (2 lb/1,000 barrels) of liquid loaded into a marine tank vessel; or the emissions of VOCs to be reduced by at least 95 percent by weight from uncontrolled conditions. All equipment is required to be leak-free. Records of organic liquid loading events are required to be retained for at least two years.

As far as applicability is concerned, District Rule 4624 is a much more comprehensive rule because it applies to all organic liquid loading events. On the other hand, South Coast AQMD Rule 1142 is much narrower in scope because it applies only to the loading of marine vessels.

As far as exemptions are concerned, South Coast AQMD Rule 1142 is more stringent because it does not offer any exemptions, whereas District Rule 4624 has a throughput exemption for facilities transferring less than 4,000 gallons of liquid per day, as well as other fairly insignificant exemptions.

District Rule 4624 is more stringent than South Coast AQMD Rule 1142 under this category. Rule 4624 has two emission control requirements: (1) reduction of loading VOC emissions by 95% for facilities with a throughput of less than 20,000 gallons per day, and (2) a stricter limit of 0.08 lb/1,000 gallons for facilities with a throughput of 20,000 gallons per day or more. On the other hand, South Coast AQMD Rule 1142 gives all facilities a choice between a limit of 0.05 lb VOC/1,000 gallons and reduction of VOC emissions by 95%. It is reasonable to assume that, given a choice, facilities will take the less stringent requirement of 95% emissions reduction, hence the South Coast Rule will result in less overall emissions control in comparison to District Rule 4624.



**Source Testing and Monitoring:**

There is no significant difference between the two rules under this category.

**Reporting:**

There is no significant difference between the two rules under this category.

**Record Keeping:**

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas South Coast AQMD Rule 1142 requires only two years of record retention.

The preceding comparison demonstrates that, taking all the comparison categories into consideration, District Rule 4624 is more stringent than South Coast AQMD Rule 1142.

**C. Bay Area AQMD Regulation 8 Rule 6**

The purpose of Bay Area AQMD Regulation 8 Rule 6, *Terminals and Bulk Plants*, is to limit emissions of organic compounds from transfer operations at non-gasoline organic liquid bulk terminals and bulk plants.

The rule provides the following exemptions: (a) liquids with a TVP less than 0.5 psi; (b) facility-wide annual organic liquid (with TVP of at least 1.5 psia) throughput of 600,000 gallons or less; (c) spills resulting from maintenance and repair; (d) liquefied gases such as LPG.

The rule requires loading of organic liquids to be done only using a vapor loss control system which limits VOC vapor emissions into the atmosphere to 0.17 lb/1,000 gallons for bulk terminals and 0.35 lb/1,000 gallons for bulk plants. Submerged fill pipe or bottom loading is required for transferring organic liquid into delivery vehicles or transportable containers. The rule requires the vehicles loaded with organic liquid shall be equipped to allow proper connection to the vapor balance system or vapor loss control system and shall be maintained to be vapor tight, leak free, and in good working order.

Required records include (1) true vapor pressure of each organic liquid and organic liquid mixture (2) monthly throughput records. Records are required to be retained for two years.

District Rule 4624 is compared to Bay Area AQMD Regulation 8 Rule 6 under the following categories:

**Applicability/Exemption:**

The applicability is the same for both rules. San Joaquin Valley APCD has one rule (4624) that applies to loading/transfer operations regardless of the type of facility doing the loading/transfer, whereas Bay Area AQMD applies the loading/transfer requirements through three different facility-specific rules.

District Rule 4624 is less stringent in the throughput-based exemption because it allows an exemption up to 4,000 gallons a day (1,460,000 gallons per year), whereas Bay Area AQMD Regulation 8 Rule 6 allows only 600,000 gallons per year.

There is no difference in the TVP exemptions since requirements for both rules generally apply to liquid with a TVP of at least 1.5 psia.

**Requirements:**

District Rule 4624 is more stringent than Bay Area AQMD Regulation 8 Rule 6 because it requires a VOC emission limit of 0.08 lb/1,000 gallon, whereas Bay Area AQMD Regulation 8 Rule 6 requires a VOC emission limit of 0.17 lb/1,000 gallon.

**Source Testing and Monitoring:**

There is no significant difference between the two rules under this category.

**Reporting:**

There is no significant difference between the two rules under this category.

**Record Keeping:**

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Bay Area AQMD Regulation 8 Rule 6 has a two-year record retention requirement.

The preceding comparison demonstrates that, taking all the comparison categories into consideration, District Rule 4624 is more stringent than Bay Area AQMD Regulation 8 Rule 6. Although District Rule 4624's throughput exemption is only half as stringent, its VOC emission, which is a much more critical aspect of the regulation, is twice as stringent as the corresponding Bay Area AQMD Regulation 8 Rule 6 limit.

**D. Bay Area AQMD Regulation 8 Rule 33**

The purpose of Bay Area AQMD Regulation 8 Rule 33, *Gasoline Bulk Terminals and Gasoline Delivery Vehicles*, is to limit emissions of organic compounds from transfer operations at gasoline bulk terminals and delivery vehicles.

The rule provides the following exemptions: (a) delivery vehicles delivering exclusively to small tanks (< 550 gallons) or tanks for which vapor recovery is not feasible; (b) spills resulting from maintenance and repair.

The rule requires loading of gasoline to be done only using a vapor recovery system which limits VOC vapor emissions into the atmosphere to 0.08 lb/1,000 gallons. Bottom loading is required for transferring gasoline into delivery vehicles. All gasoline transfer equipment shall be maintained leak-free, vapor tight and in good working condition. The vapor recovery system shall be operated and maintained to prevent pressure in the tank from exceeding 18" water column during loading.

District Rule 4624 is compared to Bay Area AQMD Regulation 8 Rule 33 under the following categories:

**Applicability/Exemption:**

The applicability is the same for both rules. San Joaquin Valley APCD has one rule (4624) that applies to loading/transfer operations regardless of the type of facility doing the loading/transfer, whereas Bay Area AQMD applies the loading/transfer requirements through three different facility-specific rules.

Exemptions are fairly comparable between the two rules. The main exemption provided by District Rule 4624 is the throughput exemption for facilities transferring less than 4,000 gallons of liquid per day, whereas the main exemption offered by Bay Area AQMD Regulation 8 Rule 33 is loading of delivery vehicles that serve small tanks or tanks without vapor recovery.

**Requirements:**

There is no significant difference between the two rules under this category.

**Source Testing and Monitoring:**

There is no significant difference between the two rules under this category.

**Reporting:**

There is no significant difference between the two rules under this category.

**Record Keeping:**

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Bay Area AQMD Regulation 8 Rule 33 has no record retention requirement.

The preceding comparison demonstrates that, taking all the comparison categories into consideration, District Rule 4624 is as stringent as Bay Area AQMD Regulation 8 Rule 33. Both rules offer fairly comparable exemptions, and require the use of a vapor recovery system with a VOC emission limit of 0.08 lb/1,000 gallons and bottom loading.

## **E. Bay Area AQMD Regulation 8 Rule 39**

The purpose of Bay Area AQMD Regulation 8 Rule 39, *Gasoline Bulk Plants and Gasoline Delivery Vehicles*, is to limit emissions of organic compounds from transfer operations at gasoline bulk plants and delivery vehicles.

The rule provides the following exemptions: (a) delivery vehicles delivering exclusively to small tanks (< 550 gallons) or tanks for which vapor recovery is not feasible; (b) spills resulting from maintenance and repair.

The rule requires loading of gasoline to be done only using a vapor recovery system which limits VOC vapor emissions into the atmosphere to 0.50 lb/1,000 gallons. All gasoline transfer equipment shall be maintained leak-free, vapor tight and in good working condition. The vapor recovery system shall be operated and maintained to prevent pressure in the tank from exceeding 18" water column during loading.

District Rule 4624 is compared to Bay Area AQMD Regulation 8 Rule 39 under the following categories:

### **Applicability/Exemption:**

The applicability is the same for both rules. San Joaquin Valley APCD has one rule (4624) that applies to loading/transfer operations regardless of the type of facility doing the loading/transfer, whereas Bay Area AQMD applies the loading/transfer requirements through three different facility-specific rules.

Exemptions are fairly comparable between the two rules. The main exemption provided by District Rule 4624 is the throughput exemption for facilities transferring less than 4,000 gallons of liquid per day, whereas the main exemption offered by Bay Area AQMD Regulation 8 Rule 39 is loading of delivery vehicles that serve small tanks or tanks without vapor recovery.

### **Requirements:**

District 4624 is more stringent under this category because it requires a vapor recovery system with a VOC emission limit of 0.08 lb/1,000 gallons, whereas Bay Area AQMD Regulation 8 Rule 39 allows VOC emissions up to 0.50 lb/1,000 gallons from the vapor recovery system. Rule 4624 also requires bottom loading, whereas Bay Area AQMD Regulation 8 Rule 39 does not.

### **Source Testing and Monitoring:**

There is no significant difference between the two rules under this category.

**Reporting:**

There is no significant difference between the two rules under this category.

**Record Keeping:**

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Bay Area AQMD Regulation 8 Rule 39 has no record retention requirement.

The preceding comparison demonstrates that, taking all the comparison categories into consideration, District Rule 4624 is more stringent than Bay Area AQMD Regulation 8 Rule 39. Both rules offer fairly comparable exemptions, but Rule 4624 has a more stringent VOC emission limit of 0.08 lb/1,000 gallons and requires bottom loading.

**F. Sacramento Metro AQMD Rule 447**

Sacramento Metro AQMD Rule 447, *Organic Liquid Loading*, is applicable to the loading of organic liquids into any tank truck, trailer, or railroad tank car from a bulk plant or a bulk terminal.

The rule provides an exemption for organic liquids with a vapor pressure of less than 0.5 psia.

The rule requires emissions to be limited to 0.08 lb VOC/1,000 gallons for organic liquid bulk terminals and 0.6 lb VOC/1,000 gallons for bulk plants. The system of achieving the emission limits is not specified. However, the rule further states that for gasoline loading a CARB-certified vapor recovery system must be used. Loading equipment must be maintained leak-free.

Records required include inspection records and any testing results. Records are required to be retained for at least three years.

District Rule 4624 is compared to Sacramento Metro AQMD Rule 447 under the following categories:

**Applicability/Exemption:**

There is no significant difference between the two rules under this category.

**Requirements:**

District 4624 is more stringent under this category because it requires a vapor recovery system with a VOC emission limit of 0.08 lb/1,000 gallons (or 95% control efficiency for facilities with less than 20,000 gallons throughput) for all loading operations, whereas

Sacramento Metro AQMD Rule 447 allows emission as high as 0.6 lb VOC/1,000 gallons for loading operations at bulk plants.

**Source Testing and Monitoring:**

There is no significant difference between the two rules under this category.

**Reporting:**

There is no significant difference between the two rules under this category.

**Record Keeping:**

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Sacramento Metro AQMD Rule 447 requires a record retention period of only 3 years.

The preceding comparison demonstrates that, taking all the comparison categories into consideration, District Rule 4624 is more stringent than Sacramento Metro AQMD Rule 447.

**G. Ventura County APCD Rule 70**

Ventura County APCD Rule 70, *Storage and Transfer of Gasoline*, is applicable to the storage and transfer of gasoline.

The rule provides several exemptions for: (a) gasoline bulk plants where the average daily gasoline throughput has not exceeded 4,000 gallons on a thirty day rolling average and the gasoline throughput has not exceeded 200,000 gallons on a twelve month rolling average; (b) gasoline bulk plants that load exclusively to gasoline delivery vessels that service only storage containers that are not required to be equipped with Phase I vapor recovery systems;

The rule requires the transfer of gasoline at bulk plants to be done only using a vapor recovery system that prevents 90 percent of the displaced vapors from being released into the atmosphere, and has a maximum emissions factor of 0.84 lbs of hydrocarbon emitted per 1000 gallons of throughput. For transfers at gasoline terminals, the vapor recovery system shall have a VOC emission limit of 0.08 lb/1,000 gallons, and only bottom loading shall be used. Switch-loading at bulk plants or terminals must be done only with the use of a vapor recovery system. Vapor recovery equipment shall be maintained leak-free and in good working order.

Records required include throughput records and delivery destination records needed to substantiate gasoline loading vapor recovery exemption; and vapor recovery system maintenance records.

Records are required to be retained for up to two years.

District Rule 4624 is compared to Ventura County APCD Rule 70 under the following categories:

**Applicability/Exemption:**

The applicability is the same for both rules. San Joaquin Valley APCD has one rule (4624) that applies to loading/transfer operations regardless of the type of facility doing the loading/transfer, whereas Ventura County APCD applies the loading/transfer requirements through two different facility-specific rules.

Exemptions are fairly comparable between the two rules. The main exemption provided by District Rule 4624 is the throughput exemption for facilities transferring less than 4,000 gallons of liquid per day, whereas Ventura County APCD Rule 70 provides a throughput exemption and also an exemption for gasoline loads destined for vapor recovery-exempt tanks. Ventura County APCD Rule 70's exemption is stricter (4,000 gallons per month and 200,000 gallons per year).

**Requirements:**

District 4624 is more stringent under this category because it requires a vapor recovery system with a VOC emission limit of 0.08 lb/1,000 gallons, or 95% control efficiency depending on facility throughput, whereas Ventura County APCD Rule 70 allows VOC emissions up to 0.84 lb/1,000 gallons (or 90% control efficiency) for bulk plant gasoline transfer vapor recovery systems. Rule 4624 also requires bottom loading, whereas Ventura County APCD Rule 70 does not require bottom loading for bulk plants.

**Source Testing and Monitoring:**

There is no significant difference between the two rules under this category.

**Reporting:**

There is no significant difference between the two rules under this category.

**Record Keeping:**

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Ventura County APCD Rule 70 requires a record retention period of only 2 years.

The preceding comparison demonstrates that, taking all the comparison categories into consideration, District Rule 4624 is more stringent than Ventura County APCD Rule 70. Both rules offer fairly comparable exemptions, but Rule 4624 has a more stringent VOC emission limit of 0.08 lb/1,000 gallons for liquid transfer vapor recovery systems, and also requires bottom loading.

## H. Ventura County APCD Rule 71.3

Ventura County APCD Rule 71.3, *Transfer of Reactive Organic Compound Liquids*, is applicable to equipment used to transfer reactive organic compound (ROC) liquids with a Modified Reid Vapor Pressure (MRVP) greater than or equal to 0.5 psia.

The rule provides several exemptions for: (a) organic liquid with a modified Reid Vapor Pressure of less than 0.5 psia; (b) transfer, production or separation of crude oil; (c) tank marker calibration activities.

The rule requires the use of submerged fill pipe or bottom loading for transfer of organic liquids. For facilities with a throughput of 20,000 gallons per day or 150,000 gallons per year, a vapor recovery system must be used during liquid transfer and collected vapors condensed and sent into a gas pipeline or treated in a vapor treatment system capable of a 90% destruction efficiency. An overfill protection device is also required during loading. The loading equipment shall be leak-free and the vapor recovery system shall be operated and maintained so that it does not cause the pressure in any delivery vessel to exceed 18 inches water gauge or the vacuum to exceed 6 inches water gauge.

The rule requires operators to annually monitor one complete loading operation for leaks and for proper operation of the loading equipment and delivery vessel vapor recovery and overfill protection systems, and notify the APCD within 72 hours if any problems were detected.

Records required include inspection records, throughput and vapor pressure records needed to substantiate exemptions; and vacuum truck loading records.

Records are required to be retained for at least two years.

District Rule 4624 is compared to Ventura County APCD Rule 71.3 under the following categories:

### **Applicability/Exemption:**

The applicability is the same for both rules. San Joaquin Valley APCD has one rule (4624) that applies to loading/transfer operations regardless of the type of facility doing the loading/transfer, whereas Ventura County APCD applies the loading/transfer requirements through two different facility-specific rules.

District Rule 4624 is more stringent in the exemptions provided because it exempts only facilities transferring less than 4,000 gallons of liquid per day, whereas Ventura County APCD Rule 71.3 basically exempts (by not requiring a vapor recovery system) loading operations where the throughput is less than 20,000 gallons per day.



**Requirements:**

District 4624 is more stringent under this category because it requires a vapor recovery system with a VOC emission limit of 0.08 lb/1,000 gallons, or 95% control efficiency depending on facility throughput, whereas Ventura County APCD Rule 71.3 requires only a 90% control efficiency for the vapor recovery system.

**Source Testing and Monitoring:**

There is no significant difference between the two rules under this category.

**Reporting:**

There is no significant difference between the two rules under this category.

**Record Keeping:**

District Rule 4624 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Ventura County APCD Rule 71.3 requires a record retention period of only 2 years.

The preceding comparison demonstrates that, taking all the comparison categories into consideration, District Rule 4624 is more stringent than Ventura County APCD Rule 71.3.

**Conclusion**

After evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4624 satisfies RACT for Transfer of Organic Liquid.

## Rule 4625 – Wastewater Separators

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.19

(Source: District 2007 Ozone Plan)

### District Rule Description

Rule 4625, amended on December 17, 1992, applies to wastewater separators. The rule does not apply to the separation of crude oil and water prior to custody transfer. The rule prohibits the use of any compartment of any vessel or device operated for the recovery of oil or tar from effluent water, from equipment which processes, refines, stores, or handles petroleum or coal tar products unless such compartments are equipped with one of the following: (1) a solid cover with all openings sealed and totally enclosing the liquid contents of the compartment; (2) a floating pontoon or double deck type cover with closure seals that meet specific requirements of the rule; or (3) a vapor recovery system with a combined collection and control efficiency of at least 90%. Control devices must be under District permit. Any gauging and sampling device in the compartment cover must be equipped with a cover or lid, which must be closed at all times except when the device is in actual use. Although not specifically indicated in Rule 4625, components that are used in refinery wastewater separator operations are also subject the leak standards, inspection and repair provisions specified in Rule 4455 (Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants).

### How does District Rule 4625 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

EPA-450/2-77-025 (Control of Refinery Vacuum Producing Systems, Water Separators and Process Unit Turnarounds), October 1977, indicates that RACT for wastewater separators requires control of VOC emissions by covering the forebays and separator sections to minimize the amount of oily water exposure to the atmosphere. The requirements include a solid cover with all openings sealed totally enclosing the compartment liquid contents; or a floating pontoon or double deck type cover, equipped with closure seals to enclose the space between the cover's edge and compartment wall. Rule 4625 control requirements are basically the same as the CTG.

EPA also published a Draft CTG (EPA-453/D-93-056) dated September 1992 for control of VOC emissions from industrial wastewater. EPA has not yet finalized the draft CTG. In April 1994, EPA published an ACT document: Air Emissions from Industrial

Wastewater. The ACT consists of cover memo with option tables and a draft CTG. Since the draft CTG has not been finalized by EPA, District staff believes that it would not be appropriate to consider it for RACT determinations.

## **B. EPA – Alternative Control Techniques (ACT) Document**

As discussed above, in April 1994, EPA published an ACT document: Air Emissions from Industrial Wastewater. The ACT consists of cover memo with option tables and a draft CTG. Since the draft CTG has not been finalized by EPA, District staff believes that it would not be appropriate to consider it for RACT determinations.

## **C. Standards of Performance for New Stationary Sources (NSPS)**

40 CFR 60 Subpart QQQ (Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems), also known as a New Source Performance Standard (NSPS) applies to petroleum refineries for which construction, modification, or reconstruction is commenced after May 4 1987. The NSPS requires a fixed roof that completely covers oil water separator tanks, slop oil tanks, storage vessels, or other auxiliary equipment with no separation between the roof and wall including certain requirements that are basically similar to Rule 4625. As an alternative to operating a fixed roof cover, the NSPS allows an operator to operate a floating roof cover provided it meets certain requirements specified in the NSPS. Rule 4625 seal gap requirement (i.e., gap between the seal and the separator wall) is more stringent than specified in the NSPS. It should be noted that any tank or vessel could be subject to the VOC emission control requirements of Rule 4623 (Storage of Organic Liquids) depending on the tank size and the TVP of the organic liquid. Rule 4623 includes a design and operational requirements for floating roof tanks. Overall, Rule 4625 is as stringent as the NSPS. There are only six facilities that operate a total of eight permitted oil/water separators in the District. Seven of the eight wastewater separators are located in petroleum refineries which are subject to the NSPS requirements by permit conditions. One is a liquid waste management company (non-refinery) wastewater separator so it is not subject to the NSPS.

## **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

40 CFR 63 Subpart VV (National Emission Standards for Oil-Water Separators and Organic-Water Separators) requires a fixed roof or a floating roof to control emissions from wastewater separators. The design and operational requirements for a fixed roof are essentially similar to Rule 4625. The allowable gap between the primary seal and the separator wall perimeter is 3.8 cm (1.469 inch) and for secondary seal the gap allowance is 1.3 cm (0.5 inch). The gap allowances are greater than 0.125 inch gap allowed by Rule 4625. Based on the above discussion, District staff believes that is as stringent as the NESHAP/MACT standards.

**How does District Rule 4625 compare to rules in other air districts?**

District staff reviewed other nonattainment California air districts' rules (South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD), Sacramento Air Quality Management District (SMAQMD) and Ventura County Air Pollution Control District (VCAPCD) that control the VOC emissions from wastewater separators as discussed below.

A. SCAQMD Rule 1176 (VOC Emissions from Wastewater Systems), amended September 13, 1996

SCAQMD Rule 1176 requires either a fixed roof cover equipped with a closed vent system vented to a control device, or a floating roof cover, with seals, which meets certain specific design and operational requirements. Wastewater separators with fixed roof covers are not required to be equipped with closed vent system if the hatches on covers are kept closed and free of gaps except when opened for active inspection, maintenance, sampling, or repair. This requirement is essentially as stringent as Rule 4625 requirement for fixed roof cover requiring all openings be sealed, and any gauging and sampling device in the cover be equipped with a cover or lid which must be in a closed position at all times except when the device is in actual use. The seal gap requirements of Rule 1176 (i.e., gap between the separator wall and the seal does not exceed 1/8 inch for a cumulative length of 97% of the perimeter the separator, and no gap between the wall and the seal must exceed 1/2 inch) are similar to Rule 4625. District staff believes that the VOC control requirements of Rule 4625 are equivalent to SCAQMD Rule 1176.

B. BAAQMD Regulation 8 Rule 8 (Organic Compounds – Wastewater Collection and Separation Systems), amended September 15, 2004

BAAQMD Regulation 8 Rule 8 requires fixed roof covers or a floating roof covers on wastewater separators and/or forebays that meet specific design and operational requirements. Rule 8 fixed roof cover requires that no gap greater than 0.32 cm (0.125 inch) to occur in the roof or between the roof and the wall. In comparison Rule 4625 does not allow any gap on the roof or between the roof and wall, except for breathing vents as are structurally necessary.

In lieu of a fixed cover, BAAQMD Regulation 8, Rule 8 allows the operation of a floating pontoon or double deck vapor-tight cover that must rest entirely on the liquid surface, and consists of a primary seal and secondary seal. Rule 8 specifies that no gap between the wall and the primary seal should not exceed 1.5 inch; no continuous gap greater than 0.125 inch should exceed 10% of the perimeter of the separator; the cumulative length of all primary seal gaps exceeding 0.5 inch should be not more than 40 percent of the perimeter. For secondary seal, the gap between the wall and the secondary and wiper seals should not exceed 0.06 inch; the cumulative length of all secondary and wiper seal gaps exceeding 0.02 inch should not be more than 5% of the perimeter of the separator.

In comparison, Rule 4625 requires a floating pontoon or double deck type cover with primary and secondary seals installed and maintained so that gaps between the compartment wall and seal should not exceed 1/8 inch (0.125 inch) for an accumulative length of 97% of the perimeter of the tank, and should not exceed 1/2 inch for a cumulative length of the remaining 3% of the perimeter of the tank. No gap between the compartment wall and the seal shall exceed 1/2 inch. Rule 4625 is more stringent than BAAQMD Regulation 8, Rule 8 for primary seal (i.e., 0.125 inch for 97 percent versus 0.125 for 90 percent of the perimeter of the tank). The difference in secondary seal gap between Rule 4625 and Rule 8 (i.e., 0.125 inch versus 0.06 inch for secondary seal gap) is relatively small such that the overall VOC emissions reduction is not significantly affected. It is important to note that there are no wastewater separators with a floating roof permitted for operation in the District.

C. VCAPCD Rule 74.8 (Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds), amended July 5, 1983

VCAPCD Rule 74.8 prohibits the use of any distribution header or compartment of a wastewater separator unless the header or compartment is equipped with a solid cover with all openings sealed totally enclosing the compartment liquid contents except for breathing vents as are structurally necessary, or equipped with a floating cover which extends to within 0.125 inches of the wall of the compartment or header at all points on the perimeter of the cover except for over a cumulative length of no more than 3 percent of the perimeter; for over 3 percent of the perimeter, the cover should extend to within 0.5 inches of the wall.

In comparison, Rule 4625 requires a floating pontoon or double deck type cover with primary and secondary seals installed and maintained so that gaps between the compartment wall and seal should not exceed 1/8 inch (0.125 inch) for an accumulative length of 97% of the perimeter of the tank, and should not exceed 1/2 inch for a cumulative length of the remaining 3% of the perimeter of the tank. No gap between the compartment wall and the seal shall exceed 1/2 inch. Based on the above discussion, District staff believes that the VOC control requirements of Rule 4625 are equivalent to VCAPCD Rule 74.8.

D. SMAQMD has no rule for wastewater separators.

### **Conclusion**

District staff concludes that District Rule 4625 satisfies RACT for Wastewater Separators.



## **Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations)**

### **Emissions Inventory:**

Tons per day – summer season

<b>Pollutant</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2020</b>	<b>2023</b>
NOx	0	0	0	0	0	0	0	0
VOC	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.7

(Source: District 2007 Ozone Plan)

### **District Rule 4641 Description**

District Rule 4641 applies to the manufacturing and use of cutback asphalt, slow cure asphalt, and emulsified asphalt for paving and maintenance operations. The rule does not apply to the manufacturing of cutback asphalt or emulsified asphalt where such materials are for shipment and use outside the District. The rule prohibits manufacture for sale or use in the District for penetrating prime coat, tack coat, dust palliative, or other paving and maintenance operations any rapid cure cutback asphalt, medium cure asphalt, slow cure asphalt containing more than 0.5 % organic compounds which evaporate at 500<sup>o</sup>F or lower, and emulsified asphalt containing more than 3% by volume organic compounds which evaporate at 500<sup>o</sup>F. Manufacturers of cutback, slow cure, or emulsified asphalt for dust palliative or other road paving and maintenance operations are required to keep daily records showing the types and amount of organic-compounds containing asphalt produced and the destination of such products. Users of such asphalt must also keep records of the types and amount of asphalt received, and the amounts used.

District Rule 4641 does not apply to the manufacture of cutback asphalt or emulsified asphalt in the manufacturing of paving materials where such materials are for shipment and use outside the District. The use of medium cure asphalt is allowed where the National Weather Service official forecast of the high temperature for the 24 hour period following application is below 50<sup>o</sup>F.

### **How does District Rule 4641 compare with federal rules and regulations?**

#### **A. EPA – Control Technique Guidelines (CTG)**

*EPA-450-2-77-037 (Control of Volatile Organic Compounds from Use of Cutback Asphalt)*

This CTG establishes the recommended standards to control of VOC emissions from paving asphalts liquefied by petroleum distillates. Liquefied asphalt is generally referred to as cutback asphalt. The VOC content of cutback asphalt ranges from 20 to 50 percent by volume. VOC emissions occur as the cutback asphalt evaporates. The CTG

indicates that the control technique for reducing VOC emissions from the cutback asphalt for paving application is to substitute an emulsifying agent or water for the petroleum distillates. Emulsified asphalt consist of asphalt suspended in water (98%) containing emulsifier (2%). “Federal RACT for cutback asphalt is defined in terms of substitution of emulsified asphalt for cutback asphalt, rather than in terms of emission limit.”<sup>14</sup> The substitution of emulsified asphalt reduces VOC emissions by 0.78 tons per ton of slow cured asphalt, 0.209 tons per ton of medium cured asphalt, and 0.204 tons per ton of rapid cure asphalt. The CTG does not indicate any specific VOC content limits for cutback asphalt and emulsified asphalt.

Rule 4641 prohibits manufacture for sale or use in the District for penetrating prime coat, tack coat, dust palliative, or other paving and maintenance operations any rapid cure cutback asphalt, medium cure asphalt, slow cure asphalt containing more than 0.5 % organic compounds which evaporate at 500<sup>o</sup>F or lower, and emulsified asphalt containing more than 3% by volume organic compounds which evaporate at 500<sup>o</sup>F. Based on the above discussion, District staff deems that District Rule 4641 is as stringent as the CTG.

In response to April 1, 2009 EPA comments recommending the District explain why Rule 4641 exempts the use of medium cured asphalt when the ambient temperature is less than 50<sup>o</sup>F, District staff has included the following information:

- The exemption for medium cured asphalt during colder ambient temperatures which occurs during winter (non-ozone) season is similar to EPA’s Blue Book on Cutback and Emulsified Asphalt recommended seasonal exemptions (i.e., outside of the ozone season) as opposed to temperature forecasting (e.g., applied when <50<sup>o</sup>F).
- During colder ambient temperature, VOCs do not evaporate rapidly especially from medium cured asphalt that is limited by Rule 4641 to no more than 5% organic compounds that evaporate at 500<sup>o</sup>F.
- Road construction and road repairs using asphalt are very minimal during the colder winter months, except for emergency road repairs. In addition, during winter months the San Joaquin Valley experiences the majority of rainy season and asphalt will not properly cure or harden when there is moisture on the surfaces or areas where asphalt is applied.
- District staff agrees with SCAQMD’s Technical Assessment for SCAQMD Rule 1108 (Cutback Asphalt), dated June 2008 that other states (Maine, Missouri, New York, Pennsylvania, and Rhode Island) who have adopted rules on cutback asphalt that prohibit their use during ozone season, but provided specific exemptions for applications they are actually used (e.g., prime coats, stockpiled material for pothole and road patching, dust pallatives, etc.) completely negates

<sup>14</sup> EPA-453/R-95-010 (Beyond Volatile Organic Compound – Reasonably Available Control Technology – Control Techniques Guidelines Requirements)



the seasonal restriction. As such, Rule 4641 exemption for medium cured asphalt during colder ambient temperatures is more stringent than the seasonal exemption recommended by the EPA Blue Book, and therefore meets RACT.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for cutback asphalt, slow cure asphalt, or emulsified asphalt.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

40 CFR 60 (Standards of Performance for New Sources) does not specify any NSPS for cutback asphalt, slow cure asphalt, and emulsified asphalt.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

40 CFR 61 (NESHAP) and 40 CFR (NESHAP for Source Categories) do not specify any NESHAP or MACT for cutback asphalt, slow cure asphalt, and emulsified asphalt.

### **How does District Rule 4641 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4641 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1108 (Cutback Asphalt) amended February 1, 1985
- South Coast Air Quality Management District (SCAQMD) Rule 1108.1 (Emulsified Asphalt) amended November 4, 1983
- Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 15 (Emulsified and Liquid Asphalts) amended June 1, 1994
- Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 453 (Cutback and Emulsified Asphalt Paving Materials) amended August 31, 1982
- Ventura County Air Pollution Control District (VCAPCD) Rule 74.4 (Cutback Asphalt) amended July 5, 1983

#### **A. South Coast Air Quality Management District (SCAQMD) Rule 1108 (Cutback Asphalt)**

SCAQMD Rule 1108 prohibits the sale or offer for sale for use in the South Coast any cutback asphalt containing more than 0.5% by volume organic compounds which evaporate at 260°C (500°F) or lower. The rule does not apply to the use of cutback asphalt that is subject to other SCAQMD Regulation XI, or specifically exempted in such rules. There are no specific recordkeeping requirements in SCAQMD Rule 1108.

The organic compounds limit of cutback asphalt in SCAQMD Rule 1108 is the same as the limit for slow cure asphalt in District Rule 4641. Unlike District Rule 4641, SCAQMD Rule 1108 allows the use of cutback asphalt (rapid cure, medium cure, and slow cure) if the organic content is no more than 0.5% by volume organic compounds which evaporate at 260<sup>0</sup>C (500<sup>0</sup>F) or lower. District Rule 4641 only allows use of medium asphalt where the National Weather Service official forecast of the high temperature for the 24 hour period following application is below 50<sup>0</sup>F. Based on the above discussion, District staff deems that District Rule 4641 is more stringent than SCAQMD Rule 1108.

### **B. South Coast Air Quality Management District (SCAQMD) Rule 1108.1 (Emulsified Asphalt)**

SCAQMD Rule 1108.1 prohibits the sale, offer for sale for use, or use within the air district, any emulsified asphalt containing more than 3% by volume organic compounds which evaporate at 260<sup>0</sup>C (500<sup>0</sup>F) or lower. The rule does not apply to the use of emulsified asphalt that is subject to other SCAQMD Regulation XI, or specifically exempted in such rules. There are no specific recordkeeping requirements in SCAQMD Rule 1108.

District rule 4641 is as stringent as SCAQMD Rule 1108.1 because organic compounds content limit for emulsified asphalt are the same.

### **C. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 15 (Emulsified and Liquid Asphalts)**

BAAQMD Regulation 8 Rule 15 limits the emissions of volatile organic compounds caused by the use of emulsified and liquid asphalt in paving materials and paving and maintenance operations. It prohibits the manufacture, offer for sale, or sell a liquid asphalt which will be applied at any physical location within BAAQMD. The rule contains monitoring and recordkeeping requirements. The rule prohibits use of the following asphalt in paving material or in paving and maintenance operations:

- Rapid cure asphalt
- Medium cured asphalt (except during cool weather (National Weather Service Forecasts atmospheric temperature for the 24 hour period following application will not exceed 10<sup>0</sup>C (50<sup>0</sup>F).
- Emulsified asphalt containing petroleum solvents in excess of 3% by volume.
- Slow cure asphalt (road oil) which contains more than 0.5% by volume petroleum solvents which boil at less than 260<sup>0</sup>C (500<sup>0</sup>F).

BAAQMD Regulation 8 Rule 15 prohibitions and organic compound limits for cutback asphalt (rapid cure, medium cure, and slow cure) and emulsified asphalt are the same as District Rule 4641. BAAQMD Regulation 8 Rule 15 that allows the use of medium cure asphalt during cold weather condition is the same as the exemption in District Rule 4641. Based on the above discussion, District staff deems that District Rule 4641 is as stringent as BAAQMD Regulation 8 Rule 15.

**D. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 453 (Cutback and Emulsified Asphalt Paving Materials)**

SMAQMD Rule 453 limits the emissions of VOC from the use of cutback and emulsified asphalt in paving materials, paving and maintenance operations. The rule prohibits the manufacture for sale or use in Sacramento Metropolitan air district for paving, road construction or road maintenance any rapid cure or medium cure cutback asphalt; slow cure cutback asphalt containing organic compounds which evaporate at 260<sup>0</sup>C (500<sup>0</sup>F) or lower; and emulsified asphalt (slow cure, medium cure, and rapid cure) containing more than 3% organic compounds which evaporate at 260<sup>0</sup>C (500<sup>0</sup>F).

SMAQMD Rule 453 does not apply to use of cutback (rapid cure and medium cure) and emulsified asphalt in the manufacturing of paving materials if such materials are for immediate shipment and eventual use outside of the County of Sacramento, California. The rule does not apply to the use of medium cure cutback asphalt as a penetrating prime coat until such time that as the APCO determines that a suitable substitute material is available.

SMAQMD Rule 453 prohibition on the use of rapid and medium cure asphalt is the same as District 4641, except that District Rule 4641 specifies that slow cure asphalt must not have more than 0.5% organic compounds which evaporate at 500<sup>0</sup>F or lower while SMAQMD Rule 453 only specifies that slow cure asphalt must not contain organic compounds that evaporate at 500<sup>0</sup>F or lower. In addition, SMAQMD exempts the use of medium cure cutback asphalt as penetrating prime coat within their air district until a suitable substitute material becomes available while District Rule 4641 exempts use of medium cure asphalt only when the weather temperature for the 24 hour period following application is predicted below 50<sup>0</sup>F. Based on the above discussion, District staff deems that District Rule 4641 is more stringent than SMAQMD Rule 453

**E. Ventura County Air Pollution Control District (VCAPCD) Rule 74.4 (Cutback Asphalt)**

VCAPCD Rule 74.4 prohibits the manufacture, sale, or offer for sale, use or application of rapid cure cutback asphalt for highway or street paving or maintenance, except if it is to be used as a penetrating prime coat or where the National Weather Service official forecast of the high temperature for the 24 hour period following application is below 50<sup>0</sup>F (10<sup>0</sup>C). In the South Zone, VCAPCD Rule 74.4 prohibits the use or application of emulsified asphalt containing more than 3% by volume petroleum solvents (diluent) or cutback asphalt for highway or street paving maintenance. The rule prohibits the use of road oils (slow cure asphalt) containing more than 0.5% organic compounds which boil at less than 500<sup>0</sup>F for highway or street paving or maintenance applications. VCAPCD Rule 74.4 prohibits manufacture, sale, or offer for sale cutback asphalt for use or application within Ventura County. VCAPCD Rule 74.4 does not have any recordkeeping requirements.

Both VCAPCD Rule 74.4 and District Rule 4641 prohibits the use of rapid cure cutback asphalt, emulsified asphalt containing more than 3% by volume petroleum solvents, slow cure asphalt that contains more than 0.5% organic compounds which boil at less than 500<sup>0</sup>F for highway or street paving or maintenance applications. District Rule 4641 allows the use of medium cure asphalt only if the official weather forecast of the high temperature for the 24 hour period following application is below 50<sup>0</sup>F (10<sup>0</sup>C), but VCAPCD Rule 74.4 allows the use or application of cutback asphalt if it is to be used as a penetrating prime coat or where the weather forecast is below 50<sup>0</sup>F (10<sup>0</sup>C) the 24 hour period following application. District Rule 4641 has recordkeeping requirements while VCAPCD Rule 74.4 has none. Based on the above discussion District staff deems District Rule 4641 is more stringent than VCAPCD Rule 74.4.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4641 satisfies RACT for cutback and emulsified asphalt.

## Rule 4642 – Solid Waste Disposal Sites

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	1.6	1.7	1.8	1.8	1.9	1.9	2.0	2.1

(Source: District 2007 Ozone Plan)

### District Rule 4642 Description

The purpose of this rule is to reduce volatile organic compound (VOC) emissions from solid waste disposal sites. The rule applies to any solid waste disposal site which has a gas collection system and/or control device in operation, or undergoing maintenance or repair. The rule exempts active disposal areas in a landfill, landfills which are subject to the requirements of 40 CFR 60 Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills), or Subpart Cc (Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills), and hazardous waste disposal sites. Temporary exemption is also provided during maintenance of the landfill gas collection system and/or control device.

The rule requires that the landfill gas collection system be operated in such a manner that landfill surface VOC concentrations shall not exceed 1,000 ppmv at any point. The rule requires landfill gas to be treated with a control device that achieves a VOC destruction efficiency of at least 98 percent by weight, or reduces the VOC concentration to 20 ppmv or less (measured as Methane) corrected to 3 percent oxygen. For facilities which received Authorities to Construct prior to the rule adoption date (July 20, 1995), the rule requires the control device to achieve a VOC destruction efficiency of at least 90 percent, or reduce the VOC concentration to 30 ppmv.

The rule also requires that whenever buried solid waste is brought to the surface during the installation or preparation of wells, trenches, piping, or other equipment or when landfill solid waste is excavated or moved, the operator shall cover the excavated solid waste using fresh soil, plastic sheeting, or vapor retarding foam as necessary in order to prevent odorous emissions and to minimize the release of landfill gas.

The rule allows the control system to be shut down for up to 144 hours per year for maintenance.

Initial source testing is required to demonstrate the destruction efficiency of the landfill gas control system. Annual source testing is also required to measure landfill surface VOC concentrations.

Records are required to be retained for a period of 5 years.

**How does District Rule 4642 compare with federal rules and regulations?****A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

**B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

**C. Standards of Performance for New Stationary Sources (NSPS)****1. 40 CFR 60 Subpart Cc - Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills.**

This NSPS applies to landfills that were in existence prior to May 30, 1991. The NSPS requires the control of landfill emissions from landfills that have accepted waste at any time since November 8, 1987 or have additional design capacity available for future waste deposition; have a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters; and have a nonmethane organic compound emission rate of 50 megagrams per year or more. Landfills meeting these conditions are required to install a landfill gas collection and control system meeting the specifications of 40 CFR 60.752(b)(2)(ii), which are summarized below:

- Collection systems shall be designed to handle the maximum expected gas flow rate from the entire area of the landfill; collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active (2 years or more if closed or at final grade); collect gas at a sufficient extraction rate; and be designed to minimize off-site migration of subsurface gas. In addition, passive collection systems must also be installed with liners on the bottom and all sides in all areas in which gas is to be collected.
- Collected landfill gas shall be treated by one of the following methods:
  - (1) an open flare designed and operated in accordance with 40 CFR 60.18.
  - (2) a control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen.
  - (3) a treatment system that processes the collected gas for subsequent sale or use.

The gas collection system must be operated in such a manner that the methane

concentration on the landfill surface does not exceed 500 ppmv.

The control system must be operated at all times when gas is routed to it. In the event the control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one hour.

Landfills below the capacities specified by the NSPS are required to perform initial design capacity and annual emissions calculations to demonstrate continued exemption.

An initial source test is required to demonstrate the destruction efficiency of the control system.

For the purpose of demonstrating whether the gas collection system flow rate is sufficient, the owner or operator shall measure gauge pressure in the gas collection header at each individual well.

For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen.

The owner or operator shall monitor surface concentrations of methane on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor.

The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

District Rule 4642 is compared to 40 CFR 60 Subpart Cc under the following categories:

**Applicability/Exemptions:**

40 CFR Subpart Cc applies to landfills that were constructed or modified prior to May 30, 1991. Control of landfill emissions at each landfill that meets the following conditions is required by Subpart Cc: (a) The landfill has accepted waste at any time since November 8, 1987, or has additional design capacity available for future waste deposition; (b) The landfill has a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters. The landfill may calculate design capacity in either megagrams or cubic meters with the same exemption values; (c) The landfill has a NMOC emission rate of 50 megagrams per year or more. Subpart Cc requires operators of landfills with a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters, by volume, to submit an initial design capacity report. For landfills with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, operators are required to calculate the non-methane organic compounds (NMOC) using the prescribed methodology. If the calculated NMOC

emission rate is less than 50 megagrams per year, the operator must submit an annual report and then keep recalculating the emission rate annually until such time as the emission rate is equal to or greater than 50 megagrams per year. If the NMOC emission rate, upon recalculation, is equal to or greater than 50 megagrams per year, the operator must install a collection and control system that complies with the requirements specified in Subpart Cc. Compliance schedules are also specified in Subpart Cc.

In comparison with 40 CFR 60 Subpart Cc, Rule 4642 applies to landfills which have a gas collection and control device regardless of the design capacity and the date that the landfill was constructed or modified. It is important to mention that when Rule 4642 was adopted in July 1995, District staff took into consideration that in order to prevent excessive methane accumulation (i.e., 1.25% by volume in air) within any portion of any on-site structure and in on-site structures and more than 5% by volume in air at the disposal site facility boundary, Title 27 of the California Code of Regulations (CCR) requires the operation of a gas collection and control system. Landfills subject to CCR Title 27 are also required to comply with the requirements for explosive gas control, gas monitoring and control, perimeter monitoring well construction, structure monitoring, parameter monitoring, monitoring frequency, reporting and control of excessive gas concentration, and other requirements. Therefore, to avoid duplication or overlapping of state regulatory requirements, Rule 4642 was adopted so it applies to landfills that have gas collection and control system with the assumption that landfills that are permitted by the state Integrated Waste Management Resources are already rigorously regulated by CCR Title 27. Likewise, the exemption for landfills subject to Subparts Cc or WWW are intended to avoid duplication or overlapping of regulatory requirements imposed by federal and District regulations. Rule 4642 exempts hazardous disposal sites because they are already subject to more stringent District operating permit requirements than specified in the rule.

Under Rule 4642, any landfill surface emissions exceeding 1,000 ppmv (measured as methane by a portable hydrocarbon analyzer) at any point in the landfill would necessitate the installation and operation of a District approved gas collection and control system. Based on the above discussion, District staff believes that Rule 4642 applicability is slightly more stringent than Subpart Cc applicability.

### **Requirements:**

District staff believes that Rule 4642 is as stringent as 40 CFR 60 Subpart Cc under the following requirements:

As stated above, Rule 4642 applies to landfills that have a gas collection and control system regardless of the design capacity and the date the landfill was constructed or modified compared to Subpart Cc which applies only to landfills having a specified a design capacity and specific construct or modification date. Although District Rule 4642 does not require design capacity calculation and annual emissions calculation for



landfills that do not have collection and control devices, District staff expects that landfills which have excessive surface emissions exceeding 1,000 ppmv would necessitate the operation of a gas collection and control system to lower the emissions below the threshold.

Although District Rule 4642 requires a much lower destruction efficiency of 90% (or reduction of VOC concentrations to 30 ppmv) for control systems that were permitted prior to July 20, 1995, in comparison with 98% control system or 20 ppmv VOC outlet concentration required by Subpart Cc, it should be noted that, in general, VOC control devices such as flares, thermal oxidizer, combustion devices (engines, turbines, boilers) that have a high combustion temperature and longer residence times actually achieves at least 98% VOC destruction efficiency. A review of the District Permit database indicated that landfills with a gas collection and control system are actually required to operate at least 98% destruction efficiency or reduce the VOC concentration to 20 ppmv or less, as a condition of the operating permit. Therefore, Rule 4642 is as stringent as Subpart Cc control device efficiency.

District Rule 4642 requires that a gas collection and control system be operated in such a manner that the surface emissions testing of the landfill does not exceed 1,000 ppmv (measured as methane) at any point on the surface of the landfill or along the gas transfer path. Surface emission testing should be performed with by holding the portable hydrocarbon detector probe within three inches of the surface of the landfill and further specifies the wind speed whereby surface emission testing should be terminated. In comparison, Subpart Cc referenced the operational standards specified in Subpart WWW that must be met for landfills that exceed the applicability threshold for operating a collection and control system. Subpart WWW specified that the collection system must be operated so that the concentration is less than 500 ppmv (measured as methane above background) with the detector probe placed within 5 to 10 centimeters of the ground. Based on District Compliance Division staff's experience, leak measurements taken at a greater distance from the surface of potential leak source tend to result in lower emission concentration level due to ambient air dilution compared to higher concentration readings taken very close to the leak surface. For this reason, District staff believes that Rule 4642 emission threshold of 1,000 ppmv measured within 3 inches of the landfill surface is at least as stringent as Subpart CC's 500 ppmv measured at 5 to 10 centimeters from the landfill surface. In addition, Subpart Cc does not specify any wind velocity for terminating testing but Rule 4642 requires termination of surface emissions testing when the average wind speed exceeds five miles per hour because excessive wind velocity affects the result of emissions testing. Based on the above discussion, District staff believes that Rule 4642 surface emission threshold is more stringent than Subpart Cc.

District Rule 4642 allows for shutdown of the gas collection and control system for maintenance purposes provided the District is notified at least 24 hours before performing any maintenance work, that the emissions of landfill gas into the atmosphere is minimized during shutdown, and that the gas collection and control system should not be shutdown for more than 144 cumulative hours in any calendar year. In comparison,

Subpart Cc allows deviation from emission standards during periods of start-up, shutdown, or malfunction provided the duration does not exceed 5 days for collection system and one hour for treatment or control devices. District staff believes that Rule 4642 limited duration for such maintenance allowance on an annual basis is as stringent as provided by Subpart Cc which does not have any limitation on the frequency of start-up, shutdown, or malfunction.

### **Source Testing:**

There is no significant difference between District Rule 4642 and 40 CFR 60 Subpart Cc under this category.

### **Monitoring:**

40 CFR 60 Subpart Cc in monitoring requirements. District Rule 4642 does not require collection header pressure monitoring, monthly well temperature/Nitrogen/Oxygen monitoring, or cover integrity monitoring. Such monitoring requirements appears to be directed at ensuring that the elevated parameters do not cause fires (excess air infiltration) or significantly inhibit anaerobic decomposition by killing methanogens. In comparison, Rule 4642 requires an operator to submit an Emission Control Plan which includes, among other things, an engineering evaluation of the expected landfill gas generation rate and design specifications which demonstrate that the gas collection system will meet the requirements of the rule, description of techniques used to ensure that excess vacuum and gas withdrawal resulting in air intrusion into the landfill are minimized. Although Rule 4642 does not have identical monitoring requirements, District staff believes that the Emission Control Plan requirements are accomplish similar concerns for which the above-mentioned parametric monitoring required by Subpart Cc.

### **Record Keeping:**

There is no significant difference between District Rule 4642 and 40 CFR 60 Subpart Cc under this category.

Based on the above discussion, District staff believes that overall Rule 4642 is as stringent as 40 CFR 40 Subpart Cc.

## **2. 40 CFR 60 Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills.**

This NSPS applies to solid waste landfills that commenced construction, reconstruction or modification on or after May 30, 1991. All requirements are similar to those discussed under 40 CFR 60 Subpart Cc.

The District implements 40 CFR 60 Subpart WWW by reference under District Rule 4001, *New Source Performance Standards*. A comparison between District Rule 4642

and 40 CFR 60 Subpart WWW is therefore not required since there is no overlap between sources covered by Rule 4642 (landfills in existence prior to May 30, 1991) and those covered by 40 CFR 60 Subpart WWW (landfills constructed or modified on or after May 30, 1991).

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP that could apply to solid waste disposal sites.

There is one MACT standard that applies to solids waste disposal sites – 40 CFR 63 Subpart AAAA National Emission Standards for Hazardous Air Pollutants from Municipal Solid Waste Landfills. This MACT only requires that affected sources comply with the requirements of the NSPS. No different standard that could define an applicable RACT for solid waste disposal sites is provided, hence no analysis is required.

**How does District Rule 4642 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4642 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1150 (adopted 10/15/1982)
- South Coast AQMD Rule 1150.1 (amended 3/17/2000)
- Bay Area AQMD Regulation 8 Rule 34 (amended 6/15/2005)
- Ventura County APCD Rule 74-17-1 (revised 2/9/1999)
- Sacramento Metro AQMD Rule 485 (amended 7/23/1998)

**A. South Coast AQMD Rule 1150**

South Coast AQMD Rule 1150 (Excavation of Landfill Sites) requires the submission of an Excavation Management Plan primarily to prevent nuisance conditions. Although this rule does not have a specific standard for VOC emissions, the mitigation measures required for the prevention of nuisance conditions also reduce VOC emissions. The rule states that mitigation measures such as gas collection and disposal, baling, encapsulation, covering of the material, chemical neutralizing, or other measures approved by the Executive Officer may be required.

District Rule 4642 is compared to South Coast AQMD Rule 1150 under the following categories:

**Applicability/Exemption:**

District Rule 4642 is less stringent than South Coast AQMD Rule 1150 because it applies only to landfills that were in existence prior to May 30, 1991 and have collection and control systems, whereas South Coast AQMD Rule 1150 applies to all landfills.

**Requirements:**

There is no significant difference in requirements between District Rule 4642 and South Coast AQMD Rule 1150. Both rules require mitigation measures such as covering using fresh soil, plastic sheeting, or vapor retarding foam as necessary in order to prevent odorous emissions that may cause a public nuisance.

**Source Testing, Monitoring and Record Keeping:**

There are no source testing, monitoring or record keeping requirements associated with landfill excavations.

**B. SCAQMD Rule 1150.1**

South Coast AQMD Rule 1150.1 (Control of Gaseous Emissions From Municipal Solid Waste Landfills) requires the installation of a collection and control system capable of reducing VOC emissions by at least 98 percent by weight or reducing the outlet VOC concentration to less than 20 parts per million by volume (ppmv), dry basis as hexane at 3 percent oxygen. The rule also requires landfill boundary probes and a limit of 5% by volume (50,000 ppmv) for subsurface refuse boundary VOC concentrations. The rule has two limits for landfill surface emissions: (1) 50 ppmv (as determined by portable integrated bag sampler and lab analysis) for any one 50,000 square foot landfill grid and (2) 500 ppmv (as determined by instantaneous monitoring using FID probe) at any location on the landfill. The rule has six main monitoring requirements: (1) annual source testing of landfill gas control system (2) monthly sampling and analysis of landfill gas entering control system (3) monthly sampling and lab analysis for each 50,000 square foot grid of landfill (4) quarterly instantaneous FID probe sampling for any spot on landfill surface (5) monthly boundary ambient air sampling and (6) monthly subsurface boundary probes sampling.

District Rule 4642 is compared to South Coast AQMD Rule 1150.1 under the following categories:

**Applicability/Exemption:**

District Rule 4642 applies to landfills that have a gas collection and control system regardless of whether the landfills are active or inactive status and date the landfills have received waste. Rule 4642 exempts landfills that are subject to 40 CFR 60 Subpart Cc and Subpart WWW and hazardous waste disposal sites. It is important to mention that when Rule 4642 was adopted in July 1995, District staff took into

consideration that in order to prevent excessive methane accumulation (i.e., 1.25% by volume in air) within any portion of any on-site structure and in on-site structures and more than 5% by volume in air at the disposal site facility boundary, Title 27 of the California Code of Regulations (CCR) requires the operation of a gas collection and control system. Landfills subject to CCR Title 27 are also required to comply with the requirements for explosive gas control, gas monitoring and control, perimeter monitoring well construction, structure monitoring, parameter monitoring, monitoring frequency, reporting and control of excessive gas concentration, and other requirements.

Therefore, to avoid duplication or overlapping of state regulatory requirements, Rule 4642 was adopted so it applies to landfills that have gas collection and control system with the assumption that landfills that are permitted by the state Integrated Waste Management Resources are already rigorously regulated by CCR Title 27. Likewise, the exemption for landfills that are subject to Subparts Cc or WWW are intended to avoid duplication or overlapping of regulatory requirements imposed by federal and District regulations. Rule 4642 exempts hazardous disposal sites because they are already subject to more stringent District operating permit requirements than specified in the rule. Rule 4642 exempts hazardous disposal sites because they are already subject to more stringent District operating permit requirements than specified in the rule.

SCAQMD Rule 1150.1 applies to active and inactive landfills. Rule 1150.1 defines active landfills as landfills that have received waste on and after November 8, 1987. Inactive landfills are those where wastes had been disposed of before November 8, 1987. Rule 1150.1 exempts landfills that operates a collection system such that the total organic compounds (TOC), measured as methane, do not exceed 5% by volume subsurface boundary sampling probes, and does not exceed 50 ppmv as determined by integrated samples taken on a numbered 50,000 square foot landfill grids, and does not exceed 500 ppmv above background by instantaneous monitoring at any location on the landfill. The rule also exempts landfills that emit less than 55 tons per year of nonmethane organic compounds and those that are in compliance with SCAQMD Nuisance Rule 402.

Based on the above discussion, District staff believes that the applicability and exemptions of District Rule 4642 are as stringent as SCAQMD rule 1150.1

### **Requirements:**

District Rule 4642 allows a VOC destruction efficiency of 90% (or a VOC reduction to 30 ppmv or less) for landfill gas control equipment permitted before July 20, 1995, and a destruction efficiency of at least 98% (or a VOC reduction to 20 ppmv or less) for all other permitted control equipment. SCAQMD Rule 1150.1 requires a destruction efficiency of 98% (or reduction to 20 ppmv) for all landfill gas control systems.

As discussed above, although District Rule 4642 does not have any requirements for subsurface landfill boundary VOC limits, District staff relied on the premise that landfills operating in the San Joaquin Valley air basin are already required to comply with CCR Title 27 which, among other requirements, include subsurface and boundary monitoring, recordkeeping, and reporting for specified landfill gas emissions. SCAQMD Rule 1150.1

requires the use of subsurface landfill boundary sampling probes and a subsurface landfill boundary VOC limit of 5% by volume.

District Rule 4642 requires a landfill surface VOC emission concentration limit of 1,000 ppmv or less, whereas South Coast AQMD Rule 1150.1 requires the higher limits of 50 ppmv measure by integrated sample on any 50,000 square foot grid and 500 ppmv instantaneous sample taken at any point on the landfill surface.

District Rule 4642 does not specifically have any requirement for the cessation atmospheric venting of landfill gas when the control system is inoperable, whereas South Coast AQMD Rule 1150.1 requires that when the treatment or control system is inoperable the gas conveying system and all valves in the collection, treatment and control system contributing to venting of the gas to the atmosphere shall be shut down within one hour. However, District rule 4642 has specific requirements that the gas collection and control system be operated in a manner which maximizes the amount of landfill gas extracted while preventing overdraw causing fires or damage to the collection system as well as minimizing emissions of landfill gas during maintenance, start-up, or shutdown.

**Source Testing and Monitoring:**

District Rule 4642 does not require any source testing or monitoring of subsurface landfill boundary emissions, whereas South Coast AQMD Rule 1150.1 requires monthly sampling and lab analysis of subsurface landfill boundary emissions. However, it is important to mention that District staff relied on the premise that landfills operating in the San Joaquin Valley air basin are already required to comply with CCR Title 27 which, among other requirements, include subsurface and boundary monitoring, recordkeeping, and reporting for specified landfill gas emissions. Such requirements are not included in Rule 4642 to avoid duplication of state regulatory requirements.

District Rule 4642 requires semi-annual (annual after two successful tests) FID probe sampling of landfill surface emissions, whereas South Coast AQMD Rule 1150.1 requires monthly integrated sampling and lab analysis for the 50,000 square foot grid VOC limit of 50 ppmv, and quarterly instantaneous probe sampling for the overall landfill surface limit of 500 ppmv without any specific reference to the wind speed. Although Rule 4642 has a 1,000 ppmv surface emission limit, it is important to mention that such readings are required to be taken when the average wind speed does not exceed 5 miles per hour or the instantaneous wind speed does not exceed 10 miles per hour.

District Rule 4642 does not require landfill gas or ambient air testing/monitoring, whereas South Coast AQMD Rule 1150.1 requires monthly sampling and lab analysis for both landfill gas and ambient air.

**Record Keeping:**

There is no significant difference between the two rules under this category. Both rules require record maintenance for a period of 5 years.

Based on the above discussion, District staff believes that overall District Rule 4642 is as stringent as SCAQMD Rule 1150.1.

analysis is required to determine whether the stricter requirements of South Coast AQMD Rule 1150.1 should be incorporated into District Rule 4642 for RACT purposes. A cost effectiveness and feasibility analysis is required to determine whether the stricter requirements of 40 CFR Subpart Cc should be incorporated into District Rule 4642 for RACT purposes.

Because of the extent of the differences between District Rule 4642 and South Coast AQMD Rule 1150.1, it is preferable that the required analysis be conducted under the context of a rule amendment process.

### **C. Bay Area AQMD Regulation 8 Rule 34**

Bay Area AQMD (BAAQMD) Regulation 8 Rule 34 (Solid Waste Disposal Sites) applies to Methane and VOC emissions from solid waste disposal sites.

The rule exempts old and inactive landfills (those that stopped accepting solid waste before November 8, 1987) and small landfills (those with an in-place tonnage of less than 907,194 megagrams (1,000,000 tons) of decomposable solid waste, and a maximum design capacity of less than 2.5 million megagrams (2,755,000 tons) or less than 2.5 million cubic meters; or emit less than 50 megagrams of VOC per year). Control requirements do not apply during systems shutdowns, as long as shutdowns do not exceed 240 hours per year, and emissions into the atmosphere are minimized. Requirements are also not applicable during well raising, system component repairs and other construction activities.

The rule requires the use of a landfill gas collection and control system that reduces VOCs by 98 percent by weight, or reduces VOCs to less than 120 ppmv at the outlet, and limits component leaks to 1,000 ppmv. Landfill surface VOC concentrations are limited to 500 ppmv. The rule requires each gas wellhead to operate under vacuum, and provides specifications for wellhead temperature, nitrogen and oxygen levels.

Exempt landfills are required to submit design capacity and emission rate reports to demonstrate their exemption status.

Required monitoring requirements include annual source testing for the control system, quarterly testing for collection equipment leaks, monthly well-head monitoring, quarterly monitoring of landfill surface emissions, continuous temperature monitoring for flares, gas flow meter for inlet into control device and monthly monitoring of landfill surface cover integrity.

District Rule 4642 is compared to BAAQMD Regulation 8 Rule 34 under the following categories:

**Applicability/Exemption:**

District Rule 4642 is more stringent than BAAQMD Regulation 8 Rule 34 because Rule 4642 applies to landfills which have a gas collection and control system regardless of the age and design capacity of the landfill, whereas Rule 34 applies only to landfills that accepted waste after November 8, 1987. In addition, Rule 34 contains numerous landfill exemptions (e.g., inactive or closed landfills, small design capacity landfills, low emission landfills, permanent shutdown of collection and control system, etc.), whereas Rule 4642 only exempts landfills subject to 40 CFR 60 Subparts Cc and WWW or hazardous waste landfills as previously discussed above.

**Requirements:**

District Rule 4642 requires a landfill surface emission limit of 1,000 ppmv, measured, as methane, with a portable hydrocarbon analyzer with the detector probe within 3 inches of the surface, whereas BAAQMD Rule 34 requires a 500 ppmv above background. Rule 34 defines background as ambient concentration of total organic compounds determined at least 3 meters upwind of the source to be inspected, whereas District Compliance generally considers background as a distance of 2 meters upwind of the source of the leak. In addition, Rule 4642 surface emission measurement is taken within 3 inches of the landfill surface while Rule 35 emission limit does not include any specific distance measurement. Based on District Compliance staff's field experience, leak measurements based on greater background distance and instrument probe tip distance from the leak surface are less stringent even though the leak limit is 500 ppmv when compared to 1,000 ppmv measured at a lesser background distance and closer distance from leak surface.

BAAQMD Rule 34 an emission control system which reduces the amount of NMOC by at least 98% or emit less than 120 ppmv (corrected to 3% oxygen) of NMOC at the outlet. In contrast, District Rule 4642 is more stringent because the control efficiency is 98% control efficiency or a VOC concentration reduction of 20 ppmv or less.

**Source Testing and Monitoring:**

District Rule 4642 requires semi-annual (annual after two successful tests) FID probe sampling of landfill surface emissions, whereas Bay Area AQMD Regulation 8 Rule 34 requires quarterly sampling.

Bay Area AQMD Regulation 8 Rule 34 requires quarterly testing for equipment leaks. District Rule 4642 requires semiannual surface emission testing which includes leak measurements along the gas transfer path of the gas and collection system. Leak measurement of the gas transfer path (which also includes any components and equipment) is deemed equivalent to Rule 34 equipment leak testing requirement.

District Rule 4642 does not require landfill surface cover monitoring, whereas Bay Area AQMD Regulation 8 Rule 34 requires monthly monitoring of surface cover integrity.



However, Rule 4642 surface emission testing is adequate such that any crack or degradation in the integrity of the surface cover that results to a emission level exceeding the threshold would need to be repaired/replaced so as to lower the leak to below the threshold.

District Rule 4642 does not require well-head monitoring, whereas Bay Area AQMD Regulation 8 Rule 34 requires monthly well-head monitoring. However, it is important to mention that in developing Rule 4642, District staff relied on the premise that landfills operating in the San Joaquin Valley air basin are already required to comply with CCR Title 27 which, among other requirements, include subsurface and boundary monitoring, monitoring well construction and monitoring frequency, recordkeeping, and reporting for specified landfill gas emissions. Such requirements are not included in Rule 4642 to avoid duplication of state regulatory requirements.

**Record Keeping:**

The is no significant difference between the two rules under this category. Both rules require record maintenance for a period of 5 years.

Based on the above discussion, District staff believes that District Rule 4642 is as stringent as BAAQMD regulation 8 Rule 34.

**D. Ventura County APCD Rule 74-17-1**

Ventura County APCD Rule 74-17-1 (Municipal Solid Waste Landfills) applies to landfills that were in existence prior to May 30, 1991.

The rule requires affected landfill with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, and a NMOC emission rate of 50 megagrams per year, or more than 500,000 tons of degradable waste in place, to comply with 40 CFR 60 Subpart WWW.

In addition, the rule requires that NOx emissions from flares used as landfill gas control devices shall not exceed 0.06 lb/MMBtu of heat input.

Applicable source testing, monitoring and record keeping requirements those from 40 CFR 60 Subpart WWW.

District Rule 4642 is compared to Ventura County APCD (VCAPCD) Rule 74-17-1 under the following categories:

**Applicability/Exemption:**

District Rule 4642 is more stringent than VCAPCD Rule 74-17-1 because Rule 4642 applies to landfills which have a gas collection and control system regardless of the age and design capacity of the landfill, whereas Rule 74-17-1 applies to landfills that were in existence prior to May 30, 1991 and landfills that have accepted waste since November

8, 1987 or has additional design capacity available for future waste deposition. Similar to Rule 4642, Rule 74-17-1 also exempts landfills subject to 40 CFR 60 Subpart WWW.

**Requirements:**

VOC requirements for VCAPCD Rule 74-17-1 are similar to 40 CFR 60 Subpart WWW requirements. Since a comparison between District Rule 4642 and 40 CFR 60 Subpart WWW has already been conducted, additional analysis is not necessary. However, it should be noted that Subpart WWW does not specify the frequency of conducting landfill surface emission testing, whereas District Rule 4642 requires semiannual testing.

District Rule 4642 allows for shutdown of the gas collection and control system for maintenance purposes provided the District is notified at least 24 hours before performing any maintenance work, that the emissions of landfill gas into the atmosphere is minimized during shutdown, and that the gas collection and control system should not be shutdown for more than 144 cumulative hours in any calendar year. In comparison, Subpart WWW allows deviation from emission standards during periods of start-up, shutdown, or malfunction provided the duration does not exceed 5 days for collection system and one hour for treatment or control devices. District staff believes that Rule 4642 limited duration for such maintenance allowance on an annual basis is as stringent as provided by Subpart WWW which does not have any limitation on the frequency of start-up, shutdown, or malfunction.

District Rule 4642 does not have any NO<sub>x</sub> emission limits for flares used as control devices, whereas VCAPCD Rule 74-17-1 has a NO<sub>x</sub> emission limit of 0.06 lb/MMBtu for landfill gas control flares. However, District staff's review of the Permit database, indicates that permitted flares operated in landfills have NO<sub>x</sub> limits similar to Rule 74-17-1.

**Source Testing, Monitoring and Record Keeping:**

Applicable source testing and monitoring requirements for VCAPCD Rule 74-17-1 are those for 40 CFR 60 Subpart WWW. A comparison between District Rule 4642 and 40 CFR 60 Subpart WWW has already been conducted, hence additional analysis is not necessary

Based on the above discussion, District staff believes that overall Rule 4642 is more stringent than VCAPCD Rule 74-17-1

**E. Sacramento Metro AQMD Rule 485**

The purpose of this rule is to implement the requirements of 40 CFR 60 Subpart Cc. A comparison between District Rule 4642 and 40 CFR 60 Subpart Cc has already been conducted, hence additional analysis is not required.

**Conclusion**

After evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4642 meets RACT for Municipal Waste Disposal Sites.

## Rule 4651 – Soil Decontamination Operations

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.11	0.11	0.12	0.12	0.14	0.14	0.15	0.75

(Source: District 2007 Ozone Plan)

### District Rule 4651 Description

The purpose of this rule is to reduce volatile organic compound (VOC) emissions from soil that has been contaminated with a VOC-containing liquid. This source category includes all activities involving the remediation of contaminated soils. Soil contamination from organic material occurs due to leaking storage and handling systems, operating losses, and accidental spills.

The rule exempts the following categories: (a) excavation, handling, transportation, and decontamination of less than one (1) cubic yard of contaminated soil per occurrence; (b) operations related to the accidental spillage of up to 42 gallons of VOC-containing liquid per occurrence; (c) contaminated soil exposed for the sole purpose of sampling; and (d) soil contaminated solely by a known VOC-containing liquid or a petroleum liquid that has an initial boiling point of 302°F or higher.

The rule requires a written notice to be provided to the APCO, except for emergency excavations, prior to commencement of excavation of possibly contaminated soil. A notice must also be provided within 48 hours of detection of contaminated soil and a written verification of completion of the excavation must be provided within 30 days of the completion.

The rule requires VOC monitoring every 15 minutes during excavation of contaminated soils, except during emergency excavations. Contaminated soil shall be sprayed with water or vapor suppressant and covered with plastic sheeting or a 6-inch layer of uncontaminated soil. Piles of contaminated soil must be covered if they have been inactive for more than one hour. For emergency excavations, contaminated soil must be covered within 24 hours. Stockpiles of contaminated soil must be inspected every 24 hours (except when operators are not on-site for more than 24 hours) to ensure integrity of the covering. Contaminated soil must be decontaminated, recycled, or disposed of in an approved facility within 30 days.

The rule requires that soils contaminated with a VOC concentration of 1,000 ppm or greater shall be sprayed with water or vapor suppressant and placed in sealed containers or transported to a treatment facility within 30 minutes after excavation. Contaminated soil must be covered during transportation. VOC emissions from in on-site decontamination of contaminated soil shall be controlled by a VOC collection and

control device with a VOC destruction or removal efficiency of at least 95%. The rule prohibits aeration of contaminated soil.

Decontaminated soil must be monitored for VOC concentrations before proper disposal or return to decontamination process, depending on the VOC readings. Lab analysis of VOC concentrations is required for decontaminated soil that is to be treated as uncontaminated.

Record keeping is required for VOC monitoring readings during excavations, daily inspection of contaminated soil cover, VOC concentration readings for decontaminated soil, and chain of custody for transportation and transfer of contaminated soil.

**How does District Rule 4651 compare with federal rules and regulations?**

**A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

**B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

**C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

**D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this source category.

**How does District Rule 4651 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4651 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rules 1166 (amended 5/11/2001)
- Bay Area AQMD Regulation 8 Rule 40 (amended 6/15/2005)
- Sacramento Metro AQMD (no applicable rule)
- Ventura County APCD Rule 74-29 (revised 4/8/2008)

**A. South Coast AQMD Rule 1166**

South Coast AQMD Rule 1166 (Volatile Organic Compound Emissions from Decontamination of Soil) applies to the emission of Volatile Organic Compounds (VOC) from excavating, grading, handling and treating VOC-contaminated soil as a result of leakage from storage or transfer operations, accidental spillage, or other deposition.

The following categories are exempt: (a) excavation, handling, and treating of less than one (1) cubic yard of contaminated soil; (b) removal of soil for sampling purposes; (c) accidental spillage of 5 gallons or less of VOC-containing material; and (d) emergency excavations.

The rule requires monitoring for VOC contamination every 15 minutes during excavation, and contaminated soil to be sprayed with water and/or approved vapor suppressant and covered with plastic sheeting. A daily visual inspection of all covered VOC contaminated soil stockpiles is required to ensure the integrity of the covering. The contaminated soil must be treated or removed from an excavation or grading site within 30 days.

The rule requires that soil contaminated with a VOC concentration measuring more than 1000 ppm be sprayed with water or vapor suppressant and placed in sealed containers or loaded into covered trucks for transportation offsite within 15 minutes. The rule requires that the treatment of contaminated soil shall be done using control equipment meeting Best Available Control Technology. The rule prohibits spreading, grading or screening of VOC-contaminated soil. Trucks transporting contaminated soil are required to be loaded and covered in a manner that prevents spillage, and cleaned off before leaving the loading site.

Facilities planning to excavate possibly contaminated soil must first submit a mitigation plan for approval by the APCO, and notify the APCO 24 hours before excavation. The APCO must also be notified within 24 hours of the detection of contaminated soil.

Record keeping is required for VOC monitoring readings during excavations, calibration records for monitoring equipment, daily inspection of contaminated soil cover, identification and business addresses of the generators, transporters and storage/treatment facilities for contaminated soil.

District Rule 4651 is compared to South Coast AQMD Rule 1166 under the following categories:

**Applicability/Exemption:**

District Rule 4651 is less stringent than South Coast AQMD Rule 1166 because it exempts accidental spillages up to 42 gallons of VOC containing material, whereas South Coast AQMD Rule 1166 exempts only 5 gallons.

District Rule 4651 is more stringent than South Coast AQMD Rule 1166 because it requires emergency excavations to follow the same treatment and decontamination procedures as regular excavations, whereas South Coast AQMD has no requirements for emergency excavations other than notification of the APCO.

### **Requirements:**

There are no significant differences between District Rule 4651 and South Coast AQMD Rule 1166 under this category. District Rule 4651 allows a maximum of 30 minutes to contain or truck off soils with a VOC reading of 1,000 ppm, whereas South Coast AQMD Rule 1166 allows a maximum of 15 minutes. In both cases, this requirement conveys the urgency with which the contaminated soil must be removed to a treatment facility, but it is unlikely that there will be any difference in total emissions when the overall excavation, transportation and treatment process is considered.

### **Source Testing and Monitoring:**

There are no significant differences between District Rule 4651 and South Coast AQMD Rule 1166 under this category. The following minor differences are noted:

- District Rule 4651 provides an exemption from daily monitoring for contaminated soil cover integrity when operators are not on-site for more than 24 hours, whereas South Coast AQMD Rule 1166 does not provide such an exemption. Cover monitoring applies only to soil with low contamination (since soil high contamination must be sealed in containers or trucked off in less than an hour). It is therefore unlikely will make a significant difference in emissions from such soil.
- District Rule 4651 requires VOC monitoring of decontaminated soil to determine whether it is safe to dispose of or must be further treated. South Coast AQMD Rule 1166 does not state this requirement explicitly, but the requirement is implied in the definition of contaminated soil.

### **Reporting:**

South Coast AQMD Rule 1166 is more stringent under this category because it requires submittal of a detailed excavation plan, in addition to notification of the APCO prior to commencement of excavation. District Rule 4651 does not require an excavation plan, but some of the information required to be included in the pre-excavation notification is similar to information required by South Coast AQMD Rule 1166's excavation plan. Further, District Rule 4651 requires submittal of a completion of excavation report.

### **Record Keeping:**

District Rule 4651 is more stringent under this category because it requires records to be retained for at least 5 years, whereas South Coast AQMD Rule 1166 requires only 2 years for record retention.

The preceding comparison demonstrates that District Rule 4651 is just as stringent as South Coast AQMD Rule 1166. The most significant difference between the rules is in

the exemptions category as discussed above. While District Rule 4651 has a very lax exemption for accidental spillage, South Coast AQMD Rule 1166 has an equally lax exemption for emergency excavations. Differences under the requirements, source testing and monitoring, reporting and record keeping categories are generally minor and not likely to affect overall emissions control effectiveness for either rule.

## **B. Bay Area AQMD Regulation 8 Rule 40**

The purpose of Bay Area AQMD Regulation 8 Rule 40 is to limit the emission of organic compounds from soil that has been contaminated by organic chemical or petroleum chemical leaks or spills and to control emissions from underground storage tanks during removal or replacement.

The rule provides the following exemptions: (a) contaminated soil exposed only for sampling purposes; (b) soil contaminated with a non-volatile hydrocarbon with an initial boiling point of 302 °F or higher; (c) excavation of contaminated not exceeding 1 cubic yard, or not exceeding 8 cubic yards if organic content does not exceed 500 ppmw; (d) soil contaminated by accidental spillage of five gallons or less of liquid organic compounds.

The rule requires that contaminated soil shall be kept visibly moist by water spray, treated with a vapor suppressant, or covered with continuous heavy duty plastic sheeting or other covering to minimize emissions of organic compounds to the atmosphere. Inactive piles of contaminated soil must be covered within one hour.

The rule requires that contaminated soils loaded into trucks or trailers for off site disposal or treatment shall be covered with continuous heavy duty plastic sheeting or other covering. The rule requires that within 45 days of excavation (or within 90 days for soil of organic content less than 500 ppmw), contaminated soil shall be backfilled and covered with at least 6 inches of uncontaminated soil, removed from the site, or treated to remove the contamination.

Treatment of contaminated soil shall be subject to all applicable District Rules and Regulations. Aeration of contaminated soil is prohibited.

A written notice of intention to excavate must be submitted 5 days prior to start of excavation. For emergency excavation, notice is required only as soon as possible, but still before the excavation, and must be followed by written verification no later than 30 days after the excavation. For pipeline repair excavations, notice is required no later than 30 days after the excavation.

Sampling and VOC content analysis is required to demonstrate any exemptions claimed.

District Rule 4651 is compared to Bay Area AQMD Regulation 8 Rule 40 under the following categories:



**Applicability/Exemption:**

District Rule 4651 is less stringent than Bay Area AQMD Regulation 8 Rule 40 because it exempts accidental spillages up to 42 gallons of VOC containing material, whereas Bay Area AQMD Regulation 8 Rule 40 exempts only 5 gallons.

District Rule 4651 is more stringent than Bay Area AQMD Regulation 8 Rule 40 because its small excavation exemption is limited to only one cubic yard of contaminated soil, whereas Bay Area AQMD Regulation 8 Rule 40 provides an exemption for up to eight cubic yards.

**Requirements:**

There are no significant differences between District Rule 4651 and Bay Area AQMD Regulation 8 Rule 40 under this category. The following minor difference is noted:

- District Rule 4651 is more stringent than Bay Area AQMD Regulation 8 Rule 40 because it requires treatment or disposal of contaminated soil to be done within 30 days, whereas Bay Area AQMD Regulation 8 Rule 40 allows 45 days for soil above 500 ppm in VOC concentration and 90 days for soil with less than 500 ppm VOC.
- District Rule 4651 is more stringent than Bay Area AQMD Regulation 8 Rule 40 because it requires soil with 1,000 ppm or more of VOC to be sealed in containers or trucked off to an approved treatment/disposal facility within 30 minutes of excavation, whereas Bay Area AQMD Regulation 8 Rule 40 has no such requirement.

**Source Testing and Monitoring:**

District Rule 4651 is more stringent than Bay Area AQMD Regulation 8 Rule 40 because it requires monitoring of soil for VOC concentration every 15 minutes during excavation, whereas Bay Area AQMD Regulation 8 Rule 40 has no such requirement.

**Reporting:**

There are no notable differences between the two rules under this category.

**Record Keeping:**

District Rule 4651 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Bay Area AQMD Regulation 8 Rule 40 has no requirement for the retention of records.

The preceding comparison demonstrates that District Rule 4651 is more stringent than Bay Area AQMD Regulation 8 Rule 40. Under the applicability/exemptions category, District Rule 4651 has a very lax exemption for accidental spillage, but Bay Area AQMD Regulation 8 Rule 40 has an equally lax exemption for small excavations. As discussed

above, District Rule 4651 is stricter than Bay Area AQMD Regulation 8 Rule 40 under the requirements, monitoring and record keeping categories.

### **C. Ventura County APCD Rule 74-29**

Ventura County APCD Rule 74-29 (Soil Decontamination Operations) is applicable to soils that contain gasoline, diesel fuel, or jet fuel.

The rule provides several exemptions for: (a) contamination due to leaking storage tanks used in an agricultural operations; (b) soil moving, loading or transport activities performed for the sole purpose of complying with local, state, or federal laws; (c) soil excavation or handling occurring as a result of an emergency; (d) soil aeration involving less than 1 cubic yard; (e) contamination due to a spill or release of less than five (5) gallons of VOC-containing liquid; (f) contaminated soil used as daily cover at permitted Class III Solid Waste Disposal Sites.

The rule prohibits aeration of soil emitting VOC concentrations of more than 50 ppmv. Vapor extraction, bioremediation or bioventing of soils with a VOC concentration exceeding 100 ppm are also prohibited. The rule requires monitoring for VOC contamination every 15 minutes during excavation of potentially contaminated soil and that all exposed contaminated soil surfaces shall be moistened with water or treated with a vapor suppressant or covered with continuous heavy duty plastic sheeting. Decontamination treatment or removal of soil from excavation site must begin within 30 days. Treatment must be conducted in compliance with all applicable District rules. Measures such as covering and not overloading are required to prevent spillage during transportation.

Records required include dates that soil was disturbed and the quantity of soil disturbed on each date, reasons for excavation or grading, cause of VOC soil contamination and history of the site, description of tanks or piping associated with the soil contamination, description of mitigation measures employed for dust, odors and ROC emissions, details of treatment and/or disposal of ROC contaminated soil, description of monitoring equipment and techniques, and facility layout maps.

Records are required to be retained for up to two years.

District Rule 4651 is compared to Ventura County APCD Rule 74-29 under the following categories:

#### **Applicability/Exemption:**

District Rule 4651 is more stringent than Ventura County APCD Rule 74-29 because it has fewer exemptions. The exemptions provided by Ventura County APCD Rule 74-29, including exemptions for contamination due to tanks used in agricultural operations and the use of contaminated soil as landfill cover, are likely to result in larger quantities of emissions in comparison to the exemptions provided by District Rule 4651.

**Requirements:**

District Rule 4651 is more stringent than Ventura County APCD Rule 74-29 because it requires soil with 1,000 ppm or more of VOC to be sealed in containers or trucked off to an approved treatment/disposal facility within 30 minutes of excavation, whereas Ventura County APCD Rule 74-29 has no such requirement.

**Source Testing and Monitoring:**

District Rule 4651 is more stringent than Ventura County APCD Rule 74-29 because it requires monitoring of soil for VOC concentration every 15 minutes during excavation, whereas Ventura County APCD Rule 74-29 has no such requirement.

**Reporting:**

Ventura County APCD Rule 74-29 is more stringent than District Rule 4651 under this category because it requires more detailed information about each excavation to be recorded.

**Record Keeping:**

District Rule 4651 is more stringent under this category because it requires records to be retained for at least 5 years, whereas Ventura County APCD Rule 74-29 requires only two years of record retention.

The preceding comparison demonstrates that District Rule 4651 is more stringent than Ventura County APCD Rule 74-29, since it has stricter requirements under all categories discussed above, except for reporting. It is also unlikely that reporting has any significant effect on the rule's emission control effectiveness.

**Conclusion**

After evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4651 satisfies RACT for Soil Decontamination Operations.

## Rule 4652 - Coatings and Ink Manufacturing

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

(Source: District 2007 Ozone Plan)

### District Rule 4652 Description

District Rule 4652, last amended on December 17, 1992, limits VOC emissions from coating and ink manufacturing operations.

District Rule 4652 specifies equipment design and operational procedures for processes associated with the manufacture of coatings or inks. The rule requires that portable mixing vats be covered, and includes lid configuration requirements. Stationary mixing vats are to be covered and grinding mills must have fully enclosed screens. For cleaning portable and stationary vats, as well as for cleaning high-speed dispersion mills, grinding mills, and roller mills, APCO-approved cleaning methods are required.

### How does District Rule 4652 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no EPA CTG guidance document for coating and ink manufacturing.

#### **B. EPA - Alternative Control Technology (ACT)**

There is no EPA ACT guidance document for coating and ink manufacturing.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS guidance document for coating and ink manufacturing.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District

implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

*40 CFR 63 Subpart HHHHH - National Emission Standards for Hazardous Air Pollutants: Miscellaneous Coating Manufacturing*

This NESHAP contains some of the work practice standards in Rule 4652, in addition to HAP vapor pressure reduction requirements. The NESHAP vapor pressure requirements are not directly comparable to the work practice standards in Rule 4652. In addition, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP requirements versus District Rule 4652 VOC requirements.

### **How does District Rule 4652 compare to rules in other air districts?**

District staff compared District Rule 4652 to the rules of other California ozone nonattainment air districts' rules for coating and ink manufacturing operations. The results of the analysis are discussed below.

**A. South Coast Air Quality Management District (SCAQMD) Rule 1141.1 - Coatings and Ink Manufacturing (Amended November 17, 2000)**

SCAQMD Rule 1141.1 applies to coating and ink manufacturing. The table below identifies where the rules differ. Categories not discussed means the two rules have the same requirement.

Category	Bay Area	SJ Valley	More Stringent for Category
Throughput Exemption	500 gal/day or 11,000 gal/mo	50 gal/day	SJ Valley

As shown in the table above, SJVAPCD Rule 4652 is more stringent than SCAQMD Rule 1141.1.

**B. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 35 - Coating, Ink, and Adhesive Manufacturing (June 15, 1994)**

BAAQMD Regulation 8 Rule 35 applies to coating and ink manufacturing. The table below identifies key category comparisons for the rules. Categories not discussed means the two rules have the same requirement.

Category	Bay Area	SJ Valley	More Stringent for Category
<b>Exemptions</b>			

Waterbased Coatings and/or Paste Inks	Not Exempt	Exempt	Bay Area
Low VOC Coatings/Inks	Exempt	Not Exempt	SJ Valley
Vats less than 12 gal	Not Exempt	Exempt	Bay Area
Produce less than 50 gal/day	Not Exempt	Exempt	Bay Area
<b>Requirements</b>			
Stationary Mixing Vats	Limit 15 lb-VOC/day or 80% control	Covers, except to add/sample ingredients	Bay Area
Equipment Cleaning	200 g/l, closed system, or 80% control	Minimize emissions and APCO-approved (per Rule 4661: 833 lb-VOC/mo or 90% control)	SJ Valley

As shown in the table above, there are several categories that the rules differ in stringency. However, the difference in overall emissions reductions on a mass basis is insignificant since the emissions inventory for this category is small and there are only four facilities in the SJVAPCD subject to this rule, none of which are Major Sources. Overall, SJVAPCD Rule 4652 is considered equivalent to BAAQMD Reg 8 Rule 35.

**C. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 464 (Organic Chemical Manufacturing Operations) amended September 25, 2008**

SMAQMD Rule 464 applies to organic chemical manufacturing operations. Per Rule 464, organic chemicals can include coatings. The table below identifies key category comparisons for the rules. Categories not discussed means the two rules have the same requirement.

Category	Sac Metro	SJ Valley	More Stringent for Category
<b>Exemptions</b>			
Waterbased Coatings and/or Paste Inks	Not Exempt	Exempt	Sac Metro
Vats less than 12 gal	Not Exempt	Exempt	Sac Metro
Produce less than 50 gal/day	Not Exempt	Exempt	Sac Metro
Facility less than 15 lb-VOC/day	Exempt	Not Exempt	SJ Valley
Process tank less than 15 lb-VOC/day	Exempt	Not Exempt	SJ Valley
<b>Requirements/Standards</b>			
Process Tanks/Mixing Vats	Limit 15 lb-VOC/day or 90% control	Covers, except to add/sample ingredients	Sac Metro
Equipment Cleaning	25 g/l (2009), or 90% control	Minimize emissions and APCO-approved (per Rule 4661: 833 lb-VOC/mo or 90% control)	Equivalent

As shown in the table above, there are several categories that the rules differ in stringency. However, the difference in overall emissions reductions on a mass basis is insignificant since the emissions inventory for this category is small and there are only four facilities in the SJVAPCD subject to this rule, none of which are Major Sources. Overall, SJVAPCD Rule 4652 is considered equivalent to SMAQMD Rule 464.

#### **F. Ventura County Air Pollution Control District (VCAPCD)**

No rule for coating and/or ink manufacturing facilities.

#### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4652 satisfies RACT for coating and ink manufacturing operations.

## Rule 4653 - Adhesives

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	3.2	3.3	3.5	3.6	3.9	4.1	4.3	4.9

(Source: District 2007 Ozone Plan)

### I. District Rule 4653 Description:

District Rule 4653, recently amended on September 20, 2007, sets VOC content limits for adhesives. In lieu of adhering to the VOC limits, owners/operators may use VOC control devices with a control efficiency of at least 85%, by mass. Adhesives used in laboratories, sold for specific limited uses, sold in quantities no more than 8 ounces, or used in quantities of no more than 20 gallons per year are exempt. VOC emissions are over 80% controlled, compared to uncontrolled emissions.

### II. How does District Rule 4653 compare with federal rules and regulations?

#### A. EPA – Control Technique Guidelines (CTG)

The CTG EPA-453/R-08-005 2008/09 (Control Techniques Guidelines for Miscellaneous Industrial Adhesives) applies to industrial adhesives applications located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

This CTG, dated September 2008, will be evaluated by the District for inclusion into District rules within one year.

#### B. EPA - Alternative Control Technology (ACT)

There is no EPA ACT guidance document for adhesives.

#### C. Standards of Performance for New Stationary Sources (NSPS)

There is no NSPS document for adhesives.

#### D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)

There is no NESHAPs/MACT document for adhesives.



### III. How does District Rule 4653 compare to rules in other air districts?

District staff compared District Rule 4653 with the rules of other California ozone nonattainment air districts' rules (listed below) for adhesives operations. The results of the analysis are discussed below.

- E. South Coast Air Quality Management District (SCAQMD) Rule 1168 - Adhesive and Sealant Applications (Amended January 7, 2005)
- F. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 51 - Adhesive and Sealant Products (Amended July 17, 2002)
- G. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 460 - Adhesives and Sealants (Amended November 30, 2000)
- H. Ventura County Air Pollution Control District (VCPCD) Rule 74.20 - Adhesives and Sealants (Amended January 1, 2005)

The table below identifies the category comparisons for the rules. Categories not shown means all of the rules have the same requirement.

<b>General Adhesive Application Processes</b>	<b>Bay Area (Rule 8-51)</b>	<b>South Coast (Rule 1168)</b>	<b>Sac Metro (Rule 460)</b>	<b>Ventura (Rule 74.20)</b>	<b>SJ Valley (Rule 4653)</b>
Fiberglass		80	200	200	
Flexible vinyl			250	250	
Flexible vinyl toother substrate				250	
Other Substrates	250		250	250	250
Plastic Foams	120	50		120	120
Porous Material	120		120		120
Porous Material (except wood and plastic foam)				150	
Porous Material (except wood)		50			
Rubber	250		250		250
Wood	30	30		30	30
<b>Specialty Adhesive Application Processes</b>	<b>Bay Area (Rule 8-51)</b>	<b>South Coast (Rule 1168)</b>	<b>Sac Metro (Rule 460)</b>	<b>Ventura (Rule 74.20)</b>	<b>SJ Valley (Rule 4653)</b>
ABSWelding	400	325	400	400	400
Carpet Pad Installation		50			
Cellulosic plastic welding (except ethyl cellulose)				100	

Ceramic Tile Installation	130	65	130	130	130
Computer Diskette Manufacturing	850	350	850		
Contact Adhesive Special		250			250
Contact Adhesive Specialty Substrate			250	200	
Contact Adhesive		80	250	200	250
Cove Base Installation	150	50	150	150	
Dry Wall and Panel Installation		50			
Floor covering installation (except ceramic tile)				150	
Immersible Product Manufacturing	650				
Indoor Carpet Adhesives		50			
Indoor Floor Covering Installation	150		150		
Metal to Urethane/Rubber Molding or Casting Adhesive			250		
Multipurpose Architectural (except cove base installation)				200	
Multipurpose Construction	200	70	200		200
Non membrane Roof Installation/Repair	300		300	300	
Other Plastic Cement Welding Adhesive			450		450
Other Plastic Welding	500			500	
Outdoor Floor Covering Installation	350	150	250		
Perimeter Bonded Sheet Vinyl Flooring Installation	660		660		660
Plastic Cement Welding		250			
Rubber Floor Installation		60			
Rubber Vulcanization Bonding	850				850
Sheet rubber lining installation adhesive		850			
Single- Ply Roof Material Installation/Repair	250				250
Single Ply Roof Membrane Installation/Repair Adhesive		250	250	250	

Staple and Nail Manufacturing					640
Structural Wood Member Adhesive		140			
Styrene-acrylonitrile welding adhesive				100	
Subfloor Installation		50			
Thin Metal Laminating	780		780		
Tire Retread	100	100	100	100	
Top and Trim Installation	540	250			
Traffic Marking Tape Adhesive				150	
VCT and Asphalt Tile Installation		50			
Water proof Resorcinol Glue	170		170		170
Wood Flooring Installation		100			
<b>Adhesive Primer Application Processes</b>	<b>Bay Area (Rule 8-51)</b>	<b>South Coast (Rule 1168)</b>	<b>Sac Metro (Rule 460)</b>	<b>Ventura (Rule 74.20)</b>	<b>SJ Valley (Rule 4653)</b>
Automotive Glass	700	Included Above	700	700	
Plastic Cement Welding	650		400	650	650
Single Ply Roof Membrane			250	250	
Traffic Marking Tape	150		150		250
Other	250		250	250	
<b>Application Methods</b>	<b>Bay Area (Rule 8-51)</b>	<b>South Coast (Rule 1168)</b>	<b>Sac Metro (Rule 460)</b>	<b>Ventura (Rule 74.20)</b>	<b>SJ Valley (Rule 4653)</b>
Aerosol Cans			x		
Air Atomized (for contact adhesives)					x
Airless Spray, Air Assisted Airless Spray, Air Atomized Spray (for contact adhesives)			x		
Airless Spray, Air Assisted Airless Spray, Air Atomized Spray (for viscosity 200 cp or greater)		x			

Brush or Roll Coat		X	X		X
Dip Coat		X	X		X
Electro deposition		X	X		X
Electrostatic Spray		X	X		X
Flow Coat		X	X		X
Hand Application		X	X		X
HVLP Spray		X	X		X
LVLP Spray		X	X		
Other, Transfer Efficiency Minimum		65%			65%
<b>Add-on Control Efficiency</b>	<b>Bay Area (Rule 8-51)</b>	<b>South Coast (Rule 1168)</b>	<b>Sac Metro (Rule 460)</b>	<b>Ventura (Rule 74.20)</b>	<b>SJ Valley (Rule 4653)</b>
Capture			90% by wt		
Control			95% by wt		
Overall Control		80%		85% by wt	85% by wt
<b>Solvents</b>	<b>Bay Area (Rule 8-51)</b>	<b>South Coast (Rule 1171)*</b>	<b>Sac Metro (Rule 460)</b>	<b>Ventura (Rule 74.20)</b>	<b>SJ Valley (Rule 4653)</b>
Product Cleaning (General)		25	70	70	25
Surface Prep Prior to Rubber Vulcanization					850
Repair and Maintenance Cleaning		25	70	70	25
Cleaning of Application Equipment		25	70 if not enclosed	70	25

\*Per Rule 1171 (Solvent Cleaning)

As shown in the table above, SJVAPCD Rule 4653 varies in stringency when compared to other Districts' adhesive requirements, and in some categories is less stringent.

## **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that Rule 4653 will be re-evaluated for RACT purposes upon the next amendment to rule (see Table 4-3), already scheduled for revision under the current ozone plan.

## Rule 4661 - Organic Solvents

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	4.294	4.295	4.296	4.297	4.295	4.295	4.295	4.296

(Source: District 2007 Ozone Plan)

### I. District Rule 4661 Description:

District Rule 4661, recently amended on September 20, 2007, controls VOC emissions from organic solvents. District Rule 4661 has a facility solvent VOC emission limit of 833 lb/month or a VOC capture and control system with efficiencies of 90% and 95% respectively.

### II. How does District Rule 4661 compare with federal rules and regulations?

#### A. EPA – Control Technique Guidelines (CTG)

1. The CTG EPA-450/2-77-022 1977/11 ([Control of Volatile Organic Emissions from Solvent Metal Cleaning](#)) applies to degreasing operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas. Degreasing operations are covered under District Rule 4662 (Organic Solvent Degreasing Operations). As such, this CTG is addressed within the RACT analysis for Rule 4662.
2. The CTG EPA-453/R-06-001 2006/09 ([Control Techniques Guidelines for Industrial Cleaning Solvents](#)) applies to solvent cleaning operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

The CTG requirement is a solvent VOC content limit of 50 g/L or an overall VOC control efficiency of 85%. District Rule 4661 has a solvent VOC limit of 833 lb/month or an overall VOC control efficiency requirement greater than 90%. As such, Rule 4661 is more stringent than this CTG.

#### B. EPA - Alternative Control Technology (ACT)

1. The ACT EPA-450/3-89-030 1989/08 ([Alternative Control Technology Document – Halogenated Solvent Cleaners](#)) applies to cleaning machines that use halogenated solvents. The halogenated solvents listed in the ACT

that EPA is concerned about are methylene chloride, trichloroethylene, perchloroethylene (tetrachloroethylene), CFC-113 (1,1,2-trichloro-1,2,2-Trifluoroethane), and methyl chloroform (1,1,1-trichloroethane). Rule 4661, Section 4.4 exempts halogenated hydrocarbons from the rule. However, the District addresses HAPs via rule 4102 (Nuisance) along with a Health Risk Assessment-Emissions modeling process, in addition to District 7000 series toxic rules.

2. The ACT EPA-453/R-94-015 1994/02 ([Alternative Control Techniques Document – Industrial Cleaning Solvents](#)) applies to industrial cleaning with organic solvents. The ACT focuses on suggested solvent accounting and management practices. District Rule 4661 has a facility solvent VOC emission limit of 833 lb/month or an overall VOC control efficiency requirement greater than 90%. As such, Rule 4661 is more stringent than this ACT for VOCs.
- C. *Standards of Performance for New Stationary Sources (NSPS) – There are no NSPS regulations that apply to solvents.*
- D. *National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)*

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

1. *40 CFR 63 Subpart T (National Emission Standards for HAPs: Halogenated Solvent Cleaning)*

Subpart T applies to cleaning machines that use any of the following halogenated solvents: methylene chloride, trichloroethylene, perchloroethylene (tetrachloroethylene), methyl chloroform (1,1,1-trichloroethane), carbon tetrachloride, and chloroform.

Rule 4661, Section 4.4 exempts halogenated hydrocarbons from the rule. However, the District addresses HAPs via rule 4102 (Nuisance) along with a Health Risk Assessment-Emissions modeling process, in addition to District 7000 series toxic rules.

### III. How does District Rule 4661 compare to rules in other air districts?

District staff compared District Rule 4661 with the rules of other California ozone nonattainment air districts for solvents. The results of the analysis are discussed below.

#### A. South Coast Air Quality Management District (SCAQMD) Rule 1171 - Solvent Cleaning Operations (Amended February 1, 2008)

SCAQMD Rule 1171 applies to solvent cleaning operations. The rule requires solvent VOC content limits, or a VOC capture and control system with efficiencies of 90% and 95% respectively. District Rule 4661 has a facility solvent VOC emission limit of 833 lb/month or a VOC capture and control system with efficiencies of 90% and 95% respectively. Since the two both allow identical add control efficiencies, the rules are considered equivalent. Overall SJVAPCD Rule 4661 is at least as stringent as SCAQMD Rule 1171.

#### B. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 16 - Solvent Cleaning Operations (amended October 16, 2002)

BAAQMD Reg 8 Rule 11 applies to solvent cleaning operations. The rule requires work practice standards and solvent VOC content limits, or for some categories a VOC capture and control system with a control efficiency of 90%. District Rule 4661 has a facility solvent VOC emission limit of 833 lb/month or a VOC capture and control system with efficiencies of 90% and 95% respectively. Overall SJVAPCD Rule 4661 is at least as stringent as BAAQMD Regulation 8 Rule 16.

#### C. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 441 (Organic Solvents) amended December 6, 1978

SMAQMD Rule 441 applies to solvent cleaning operations. The rule requires work practice standards and solvent VOC emission limits (e.g. 39.7 lb/day for photochemically reactive solvents, and 2970 lb/day for non-photochemically reactive solvents), or a VOC reduction of 85% via add on control. District Rule 4661 has a facility solvent VOC emission limit of 833 lb/month or a VOC capture and control system with efficiencies of 90% and 95% respectively. Overall SJVAPCD Rule 4661 is at least as stringent as SMAQMD Rule 441.

#### D. Ventura County Air Pollution Control District (VCPCD) - No organic solvent rule.

### Conclusion

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4661 satisfies RACT for organic solvents.



## Rule 4662 - Organic Solvent Degreasing Operations

### Emissions Inventory:

Tons per day - summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	4.294	4.295	4.296	4.297	4.295	4.295	4.295	4.296

(Source: District 2007 Ozone Plan)

### I. District Rule 4662 Description:

District Rule 4662, recently amended on September 20, 2007, controls VOC emissions from organic solvent degreasers (tanks, trays, drums, or other containers).

District Rule 4662 has solvent VOC content requirements for cold cleaners (25 g-VOC/L), or an equivalent control system with no less than 85% overall control for cold cleaners, open-vapor, and conveyORIZED degreasers. The rule also contains work practice standards and design requirements for these categories of source.

### II. How does District Rule 4662 compare with federal rules and regulations?

#### A. EPA – Control Technique Guidelines (CTG)

1. The CTG EPA-450/2-77-022 1977/11 ([Control of Volatile Organic Emissions from Solvent Metal Cleaning](#)) applies to degreasing operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

This 1977 CTG refers to requirements, controls, design, and work-practice standards that are no more stringent than SJVAPCD Rule 4662.

#### B. EPA - Alternative Control Technology (ACT) – There are no ACTs that apply to degreasers.

#### C. Standards of Performance for New Stationary Sources (NSPS) – There are no NSPS regulations that apply to degreasers.

#### D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs) – There are no NESHAP regulations that apply to degreasers.

### III. How does District Rule 4662 compare to rules in other air districts?

District staff compared District Rule 4662 with the rules of other California ozone nonattainment air districts for solvents. The results of the analysis are discussed below.

#### A. South Coast Air Quality Management District (SCAQMD) Rule 1122 - Solvent Degreasers (Amended October 1, 2004)

SCAQMD Rule 1122 applies to solvent degreasers. SCAQMD Rule 1122 contains solvent VOC content requirements for cold cleaners (25 g-VOC/L), or an equivalent control system with no less than 85% overall control for cold cleaners, open-vapor, and conveyORIZED degreasers. The rule also contains equivalent work practice standards and design requirements for these categories of source compared to SJVAPCD Rule 4662.

Since the two both allow identical (or equivalent) control efficiencies, the rules are considered equivalent. Overall SJVAPCD Rule 4662 is at least as stringent as SCAQMD Rule 1122.

#### B. Bay Area Air Quality Management District (BAAQMD) - No degreasing rule.

#### C. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 454 (Degreasing Operations) amended September 25, 2008

SMAQMD Rule 454 applies to solvent degreasers. SMAQMD Rule 454 contains solvent VOC content requirements for cold cleaners (25 g-VOC/L), or an equivalent control system with no less than 85% overall control for cold cleaners, open-vapor, and conveyORIZED degreasers. The rule also contains equivalent work practice standards and design requirements for these categories of source compared to SJVAPCD Rule 4662.

Since the two both allow identical (or equivalent) control efficiencies, the rules are considered equivalent. Overall SJVAPCD Rule 4662 is at least as stringent as SMAQMD Rule 454.

#### D. Ventura County Air Pollution Control District (VCPCD) Rule 74.6 (Surface Cleaning and Degreasing) amended July 1, 2004

VCPCD Rule 454 applies to solvent degreasers. VCPCD Rule 74.6 contains solvent VOC content requirements for cold cleaners (25 g-VOC/L), or an equivalent control system with no less than 85% overall control for cold cleaners, open-vapor, and conveyORIZED degreasers. The rule also contains equivalent work practice standards and design requirements for these categories of source compared to SJVAPCD Rule 4662.

Since the two both allow identical (or equivalent) control efficiencies, the rules are considered equivalent. Overall SJVAPCD Rule 4662 is at least as stringent as VCPCD Rule 454.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4662 satisfies RACT for organic solvent degreasing operations.

## Rule 4663 - Organic Solvent Cleaning, Storage, and Disposal

### Emissions Inventory:

Tons per day - summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	4.294	4.295	4.296	4.297	4.295	4.295	4.295	4.296

(Source: District 2007 Ozone Plan)

### I. District Rule 4663 Description:

District Rule 4663, recently amended on September 20, 2007, controls VOC emissions from organic solvent cleaning outside a degreaser (tank, tray, drum, or other container) as well as storage and disposal of the solvents.

District Rule 4663 has solvent VOC content requirements for general product cleaning or surface preparation, repair and maintenance cleaning, and cleaning of coating/adhesive application equipment (all 25 g-VOC/L), as well as specific other categories (ranging from 100-800 g-VOC/L) or an equivalent control system with no less than 90% overall control for the emissions generated. The rule also requires containers for solvent storage and disposal.

### II. How does District Rule 4663 compare with federal rules and regulations?

#### A. EPA – Control Technique Guidelines (CTG)

1. The CTG EPA-450/2-77-022 1977/11 ([Control of Volatile Organic Emissions from Solvent Metal Cleaning](#)) applies to degreasing operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

Since this CTG covers degreasers, it will not be compared to SJVAPCD Rule 4663.

2. The CTG EPA-453/R-06-001 2006/09 ([Control Techniques Guidelines for Industrial Cleaning Solvents](#)) applies to solvent cleaning operations located in marginal, moderate, serious or severe ozone nonattainment areas that has the potential to emit greater than or equal to 25 tons/year of VOC, and equal to greater than 10 tons/year of VOC for extreme ozone nonattainment areas.

The CTG requirement is a solvent VOC content limit of 50 g/L or an overall VOC control efficiency of 85%. District Rule 4663 has a solvent VOC limits or an

overall VOC control efficiency requirement no less than 90%. As such, Rule 4663 is more stringent than this CTG.

*B. EPA - Alternative Control Technology (ACT)*

1. The ACT EPA-450/3-89-030 1989/08 ([Alternative Control Technology Document – Halogenated Solvent Cleaners](#)) applies to cleaning machines that use halogenated solvents. The halogenated solvents listed in the ACT that EPA is concerned about are methylene chloride, trichloroethylene, perchloroethylene (tetrachloroethylene), CFC-113 (1,1,2-trichloro-1,2,2-Trifluoroethane), and methyl chloroform (1,1,1-trichloroethane). The District addresses HAPs via rule 4102 (Nuisance) along with a Health Risk Assessment-Emissions modeling process, in addition to District 7000 series toxic rules.
2. The ACT EPA-453/R-94-015 1994/02 ([Alternative Control Techniques Document – Industrial Cleaning Solvents](#)) applies to industrial cleaning with organic solvents. The ACT focuses on suggested solvent accounting and management practices. District Rule 4663 requires solvent VOC emission limits or an overall VOC control efficiency requirement greater than 90%. As such, Rule 4663 is more stringent than this ACT for VOCs.

*C. Standards of Performance for New Stationary Sources (NSPS) – There are no NSPS regulations that apply to solvents.*

*D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)*

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

*1. 40 CFR 63 Subpart T (National Emission Standards for HAPs: Halogenated Solvent Cleaning)*

Subpart T applies to cleaning machines that use any of the following halogenated solvents: methylene chloride, trichloroethylene, perchloroethylene (tetrachloroethylene), methyl chloroform (1,1,1-trichloroethane), carbon tetrachloride, and chloroform.

The District addresses HAPs via rule 4102 (Nuisance) along with a Health Risk Assessment-Emissions modeling process, in addition to District 7000 series toxic rules.

### **III. How does District Rule 4663 compare to rules in other air districts?**

District staff compared District Rule 4663 with the rules of other California ozone nonattainment air districts for solvents. The results of the analysis are discussed below.

#### **A. South Coast Air Quality Management District (SCAQMD) Rule 1171 - Solvent Cleaning Operations (Amended February 1, 2008)**

This SCAQMD rule is addressed in the SJVAPCD Rule 4661 (Solvent Cleaning) RACT-SIP analysis. Staff considers SJVAPCD solvent requirements, Rules 4661 and 4663, at least as stringent as SCAQMD Rule 1171.

#### **B. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 16 - Solvent Cleaning Operations (amended October 16, 2002)**

This BAAQMD rule is addressed in the SJVAPCD Rule 4661 (Solvent Cleaning) RACT-SIP analysis. Staff considers SJVAPCD solvent requirements, Rules 4661 and 4663, at least as stringent as BAAQMD Reg 8 Rule 11.

#### **C. Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 441 (Organic Solvents) amended December 6, 1978**

This SMAQMD rule is addressed in the SJVAPCD Rule 4661 (Solvent Cleaning) RACT-SIP analysis. Staff considers SJVAPCD solvent requirements, Rules 4661 and 4663, at least as stringent as SMAQMD Rule 441.

#### **D. Ventura County Air Pollution Control District (VCPCD) - No organic solvent rule.**

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4663 satisfies RACT for organic solvent cleaning, storage, and disposal operations.

## Rule 4672 – Petroleum Solvent Dry Cleaning Operations

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.06	0.06	0.07	0.07	0.07	0.08	0.08	1.09

(Source: District 2007 Ozone Plan)

### District Rule 4672 Description:

The purpose of this rule is to limit VOC emissions from petroleum solvent dry cleaning operations.

The rule requires that petroleum solvent dry cleaning equipment shall not be operated if solvent liquid and/or vapor is leaking from any portion of the equipment. Solvents shall be stored in closed containers. All washer lint traps, button traps, access doors and other parts of the equipment where solvent may be exposed to the atmosphere shall be kept closed at all times except as required for proper operation or maintenance. All wastes from dry cleaning facilities subject to Department of Health Services regulation shall be stored, transported and disposed of in accordance with Department of Health Services regulations.

The rule requires used filtering material to be put into a sealed container immediately after removal from the filter, unless filtering material is fully drained in a sealed filter housing for at least 24 hours before being discarded (12 hours if dried in a dryer is vented to an emission control device); or petroleum solvent content in all filtration wastes is reduced to 1.0 kilogram or less per 100 kilograms dry weight of articles dry cleaned.

Articles which have been cleaned shall be transferred to the dryer within five minutes after they are received from the washer, or shall be stored in closed transfer carts.

The rule requires petroleum solvent dry cleaners to be equipped with a control device which reduces the total emissions of petroleum solvent vapors from drying tumblers, washers, and cabinets by at least 90 percent by weight; or to have a solvent recovery dryer that recovers at least 90 percent of petroleum solvent by weight. The flow rate of recovered solvent from the solvent recovery dryer at the termination of the recovery cycle shall not exceed 0.05 liters per minute.

Leak inspection must be performed every 15 days and any detected leaks repaired within 3 days of detection.

The rule requires the following records to be maintained and retained for at least two years: (a) usage records - records showing amounts of solvents purchased and used; (b) solvent filtration records - records of pre-washed weight of articles cleaned per load; and (c) solvent filtration waste records - records which indicate the amount of volatile organic compounds contained in the filtration waste material per 100 kilograms dry weight of articles dry cleaned.

### **How does District Rule 4672 compare with federal rules and regulations?**

1. *EPA – Control Technique Guidelines (CTG)*

There is no CTG for this category.

2. *EPA – Alternative Control Technology (ACT)*

There is no ACT for this category.

3. *Standards of Performance for Petroleum Dry Cleaners (NSPS)*

*40 CFR 60 Subpart JJJ, Standards of Performance for Petroleum Dry Cleaners.*

This NSPS is applicable to dry cleaners with a rated dryer capacity of 84 pounds or greater. The NSPS requires the use of a solvent recovery dryer for all installations after 12/14/1982. The flow rate of recovered solvent from the solvent recovery dryer at the termination of the recovery cycle should be no greater than 0.05 liters per minute (*In the rules discussed, this standard is equivalent to 90% control*). The NSPS also requires the use of cartridge filters, and requires such filters to be drained in their sealed housings for at least 8 hours prior to their removal.

The NSPS further requires leak inspections to be conducted every 15 days, and any detected defects to be repaired within the subsequent 15 days.

This NSPS is less stringent than District Rule 4672 because it applies only to petroleum solvent dry cleaners with a minimum dryer capacity of 84 pounds, whereas District Rule 4672 applies to all petroleum solvent dry cleaners.

In addition, the NSPS requires filters to be drained for only 8 hours before removal, whereas District Rule 4672 requires at least 12 hours. The NSPS also allows up to 15 days for repair of leaks, whereas District Rule 4672 requires repairs within 3 days of detection.

Thus, District Rule 4672 is more stringent overall than this NSPS.



4. *National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)*

There is no NESHAP or MACT applicable to this category.

**How does District Rule 4672 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4672 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1102 (amended 11/17/2000)
- Bay Area AQMD Regulation 8 Rule 17 (amended 9/5/1990)
- Ventura County APCD Rule 74.5.1 (adopted 12/4/1990)
- Sacramento Metro AQMD Rule 444 (adopted 8/13/1981)

1. *South Coast AQMD Rule 1102 (amended 11/17/2000)*

South Coast AQMD rule 1102, *Dry Cleaners Using Solvents Other Than Perchloroethylene*, is applicable to dry cleaning equipment using petroleum solvents.

The rule requires that: (a) all washer lint traps, button traps, access doors, and other parts of the equipment where solvent may be exposed to the atmosphere shall be kept closed at all times except when required for proper operation or maintenance; (b) button and lint traps shall be cleaned each working day; (c) the still residue, used filtering material, lint, used solvent and all other wastes containing solvent shall be stored in sealed containers until properly transported for disposal; (d) for any dry cleaning system that is equipped with cartridge filters containing paper or carbon or a combination thereof, the cartridge filters shall be fully drained in a sealed filter housing for at least 24 hours before removal; (e) all solvents shall be stored in closed containers; (f) waste water evaporators shall be operated to ensure that no liquid solvent or visible emulsion is allowed to vaporize to the atmosphere.

The rule further requires the installation and use of a solvent recovery dryer or an equivalent control device that reduces VOC emissions from drying tumblers by at least 90 percent by weight. Materials which have been dry cleaned shall be transferred to the dryer by hand or in an enclosed transfer cart within five minutes after they are removed from the washer. The rule limits the amount of solvent used to less than 4.5 pounds per 100 pounds of materials dry cleaned.

Monthly leak inspections are required. Detected leaks must be repaired within 3 working days of detection.

Records of solvent usage and leak inspections/detection/repair shall be maintained and retained for at least two years.

In terms of the major emission control requirements such as the use of solvent recovery devices, handling of solvent and solvent-laden material, and leak inspections and repairs, District Rule 4672 and South Coast AQMD Rule 1102 are similar. Both rules require the use of a solvent recovery dryer or similar add-on device capable of reducing solvent emissions by at least 90%. Both rules require solvent and solvent-laden materials to be stored in sealed containers, and both rules require regular leak inspections with prompt repairs of any detected leaks.

The differences between the two rules are not significant enough to make either rule more or less stringent than the other. Therefore, District Rule 4672 is at least as stringent as South Coast AQMD Rule 1102.

## 2. Bay Area AQMD Regulation 8 Rule 17 (amended 9/5/1990)

The purpose of Bay Area AQMD Regulation 8 Rule 17, *Petroleum Dry Cleaning Operations*, is to limit the emissions of petroleum solvents used in dry cleaning facilities.

Small facilities using less than 2,642 gallons of solvent per year are exempt, as long as they maintain records of solvent usage.

The rule stipulates that a person shall not operate petroleum solvent dry cleaning equipment unless: (a) there is no solvent liquid or solvent vapor leaking from any portion of the equipment or the leaking equipment shall not be operated; (b) solvents and spent solvents are stored in closed containers; (c) all washer and dryer traps, access doors, and other parts of these pieces of equipment where solvent may be exposed to the atmosphere are kept closed at all times except when required for proper operation or maintenance; (d) cartridge filters are drained in the filter housing for at least 12 hours or placed in an enclosed device including a solvent recovery dryer until dry before being discarded; (e) all wastes from dry cleaning facilities must be maintained and transported in sealed containers and disposed of in accordance with Department of Health Services regulations; (f) articles which have been cleaned must be transferred to the dryer within five minutes after they are removed from the washer, or shall be stored in closed transfer carts.

The rule also requires the installation and use of an emission control system on the dry cleaning equipment. The required control method may be either: (a) an add-on-control device which reduces the total emissions of precursor organic compounds by at least 85 percent by weight; or (b) a solvent recovery dryer that recovers at least 85% of petroleum solvent by weight.

To comply with solvent filtration requirements, an operator may: (a) use a cartridge filtration system, or (b) reduce the total volatile organic compound content in all filtration wastes to 1.0 kilogram or less per 100 kilograms dry weight of articles cleaned (or no

more than 0.25 kilogram of solvent per kilogram of solvent still or filter waste) before disposal and exposure to the atmosphere.

The rule requires record keeping only for facilities claiming low usage exemption (records of quantities of solvent used) and those not using cartridge filters (records of weights of materials washed). Required records must be maintained for a period of two years.

District Rule 4672 is more stringent than Bay Area AQMD Regulation 8 Rule 17 because it requires a higher control efficiency (90%) for emission control add-on devices and solvent recovery dryers. In addition, unlike Bay Area AQMD Regulation 8 Rule 17, District Rule 4672 provides no low-use exemption, requires regular inspection of dry cleaning equipment and prompt repair of any leaks or defects, and requires record keeping for all affected facilities.

Thus, District Rule 4672 is more stringent overall than Bay Area AQMD Regulation 8 Rule 17.

### 3. *Ventura County APCD Rule 74.5.1 (adopted 12/4/1990)*

Ventura County APCD Rule 74.5.1, *Petroleum Solvent Dry Cleaning*, stipulates that a person shall not operate petroleum solvent dry cleaning equipment unless: (a) there is no solvent liquid or solvent vapor leaking from any portion of the equipment or the leaking equipment shall not be operated; (b) solvents and spent solvents are stored in closed containers; (c) all washer and dryer traps, access doors, and other parts of these pieces of equipment where solvent may be exposed to the atmosphere are kept closed at all times except when required for proper operation or maintenance; (d) cartridge filters are drained in the filter housing for at least 24 hours or 12 hours if further dried in an enclosed container vented to a control device; (e) all wastes from dry cleaning facilities must be maintained and transported in sealed containers and disposed of in accordance with Department of Health Services regulations; (f) articles which have been cleaned must be transferred to the dryer within five minutes after they are removed from the washer, or shall be stored in closed transfer carts.

The rule also requires the installation and use of an emission control system on the dry cleaning equipment. The required control method may be either: (a) an add-on-control device which reduces the total emissions of precursor organic compounds by at least 90 percent by weight; or (b) a solvent recovery dryer that recovers at least 90% of petroleum solvent by weight.

To comply with solvent filtration requirements, an operator may: (a) use a cartridge filtration system, or (b) a filter system or process that reduces the petroleum solvent content in all filtration wastes to no greater than 1.0 lb per 100 lb dry weight of articles cleaned.

The rule requires record keeping for weights of materials cleaned, solvent purchase and usage, hazardous waste disposal, and cartridge filter draining and drying operations. All records are to be retained for at least two years.

In terms of the major emission control requirements such as the use of solvent recovery devices, handling of solvent and solvent-laden materials, and record keeping, District Rule 4672 and Ventura County APCD Rule 74.5.1 are similar. Both rules require the use of a solvent recovery dryer or add-on device capable of reducing solvent emissions by at least 90%. Both rules require solvent and solvent-laden materials to be stored in sealed containers, and both rules require record keeping for materials cleaned and solvent usage.

The differences between the two rules are not significant enough to make either rule more or less stringent than the other. For instance, Ventura County APCD Rule 74.5.1 does not provide a specific leak inspection schedule or require leak inspections and repair records, but at the same time it stipulates that leaking equipment shall not be operated.

Therefore, District Rule 4672 is at least as stringent as Ventura County APCD Rule 74.5.1.

#### 4. *Sacramento Metro AQMD Rule 444 (adopted 8/13/1981)*

The purpose of Sacramento Metro AQMD Rule 444, *Petroleum Solvent Dry Cleaning*, is to limit the emissions of petroleum solvents used in dry cleaning facilities.

Small facilities using less than 2,642 gallons of solvent per year are exempt from emission control installation requirements, but must observe emission-limiting operating requirements.

The rule stipulates that a person shall not operate petroleum solvent dry cleaning equipment unless: (a) there is no liquid leaking from any portion of the equipment; (b) solvents are stored in closed containers; (c) all washer and dryer traps, access doors, and other parts of these pieces of equipment where solvent may be exposed to the atmosphere are kept closed at all times except when required for proper operation or maintenance; (d) still residue is stored in sealed containers or underground tanks, and disposed of by procedures approved by the Air Pollution Control Officer; (e) used filtering material shall be placed in sealed containers unless the dry cleaning system uses cartridge filters which are drained in the filter housing for at least 12 hours before removal, diatomaceous earth with centrifugal solvent extractor capable of reducing solvent content to less than 0.4 kg per kg of residue, or other filtering system capable of reducing solvent content of discarded filter material to less than 1.0 kg per 100 kg of materials cleaned.

The rule also requires that a person operating dry cleaning equipment shall: (a) limit solvent emissions to the atmosphere to an average of 3.5 kilograms of solvent per 100

kilograms of articles dry cleaned, or (b) install and operate a solvent recovery dryer in a manner such that the dryer remains closed and the recovery phase continues until a final recovered solvent flow rate of not more than 50 milliliters per minute is attained. (*In the comparable rules discussed, this standard is equivalent to an emission control of 90%*).

Although both District Rule 4672 and Sacramento Metro AQMD Rule 444 have a similar control efficiency (90%) for the dry cleaning emission control devices, District Rule 4672 has more stringent operating requirements for the handling of solvent-laden material, inspections and record keeping. District Rule 4672 requires solvent-laden materials to be transferred into dryers within 5 minutes, requires regular leak inspections and prompt repairs, and also requires record keeping for weights of materials cleaned, solvent usage and leak inspection and repair. Sacramento Metro AQMD Rule 444 has no corresponding requirements in these categories.

District Rule 4672 is therefore more stringent overall than Sacramento Metro AQMD Rule 444.

### **Conclusion**

After evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4672 satisfies RACT for Petroleum Solvent Dry Cleaning Operations.

## Rule 4681 (Rubber Tire Manufacturing)

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	0.27	0.27	0.27	0.27	0.27	0.27	0.47	0.53
VOC adjusted*	0	0	0	0	0	0	0	0

\*The inventory is suspect. This source category has no active facilities.

### I. District Rule 4681 Description:

District Rule 4681 limits the VOC emissions from rubber tire and recapping treadstock manufacturing facilities. The rule specifies emission standards for undertread cementing operations, green tire coating, bead cementing, and tread end cementing as discussed below. The rule requires containers for organic solvents and cements to be leak-free at all times, and covered except when adding or removing solvents and cements or when the containers are being cleaned or during gauging. The rule includes recordkeeping requirements. There are no exemptions in the rule. It is important to mention that there are no existing rubber tire manufacturing facilities currently operating in the District. A new rubber tire manufacturing facility that would like to operate in the District will be evaluated for Best Available Control Technology and emission offset requirements pursuant to District Rule 2201 (New and Modified Stationary Source Review Rule).

### District Rule 4681 Control Requirements

- Undertread Cementing Operation
  - Enclose the cement applicator, cement tank, and tread drying conveyor during normal operations so that VOC evaporation are captured.
  - All openings to the enclosure must have a minimum indraft of 60 meters per minute, except when it is opened to allow work inside.
  - Captured VOC must be transported to an emission control device with at least 95% removal efficiency.
  - For new sources, the tread drying conveyor must operate to capture VOC emissions from the operation for at least 30 seconds after undertread cement has been applied.
  - As an alternative control, an equivalent reduction technique approved by the APCO is allowed if the undertread cement emissions are reduced to 15 grams VOC or less per tire (daily average)
  
- Green Tire Coating Operation

- Coating must be waterborne, no more than one percent by weight if based on formulation data or 10 grams/liter of coating, including water but less exempt compounds, if determined by testing.
- **Bead Cementing Operation**
  - Operate an APCO approved emission control system or demonstrate that emissions, in grams/tire, from bead cementing operation have been reduced by at least 75% from the daily average for 3 consecutive years prior to rule adoption. A carbon adsorption must have at least 95% VOC removal efficiency and equipped with continuous VOC monitoring equipment to detect carbon bed breakthrough. An incineration system must oxidize at least 90% of VOC which enters the incinerator and equipped with temperature indicators in the combustion chambers. The collection system must achieve at least 85% collection efficiency.
- **Tread End Cementing Operation**
  - Operate an approved emission control system as described above for bead cementing operation or demonstrate that emissions, in grams/tire, from tread end cementing operation have been reduced by at least 62% from the daily average for 3 consecutive years prior to rule adoption.

## **II. How does District Rule 4681 compare with federal rules and regulations?**

### **A. EPA – Control Technique Guidelines (CTG)**

1. *EPA-450-2-78-030 (Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires), December 1978*

This CTG establishes the recommended standards to control of VOC emissions from rubber tire manufacturing plants through tight control of solvent operations and the use of effective capture systems and exhaust treatment devices. VOCs are added to rubber components to aid in mixing, promote elasticity, produce tack (stickiness, or extend (replace) a portion of the rubber hydrocarbons. The CTG recommendation to reduce solvent emissions is based on lowering the solvent content of the raw material and treating the exhaust gas. The four major sources of VOC emissions from tire manufacturing and the control technology for each that is considered reasonably available are discussed below.

- **Undertread Cementing**
  - Carbon adsorption system with a capture efficiency of 65% to 85% and control device efficiency of 95%. The overall capture and control efficiency is 62% to 81%; or
  - Incineration system with a capture efficiency of 65% to 85% and a control device efficiency of 90%. The overall capture and control efficiency is 59% to 77%.
- **Green Tire Spraying**

- Waterbased coating (overall efficiency of 97% depending on formulation; or
  - Carbon adsorption system with a capture efficiency of 80% to 90% and control device efficiency of 95%. The overall capture and control efficiency is 76% to 86%; or
  - Incineration system with a capture efficiency of 65% to 85% and a control device efficiency of 90%. The overall capture and control efficiency is 59% to 77%.
- **Bead Dipping**
- Carbon adsorption system with a capture efficiency of 75% to 85% and control device efficiency of 95%. The overall capture and control efficiency is 71% to 81%; or
  - Incineration system with a capture efficiency of 75% to 85% and a control device efficiency of 90%. The overall capture and control efficiency is 68% to 77%.
- **Tread End Cementing**
- Carbon adsorption system with a capture efficiency of 65% to 85% and control device efficiency of 95%. The overall capture and control efficiency is 62% to 81%; or
  - Incineration system with a capture efficiency of 65% to 85% and a control device efficiency of 90%. The overall capture and control efficiency is 59% to 77%.

#### *Comparison of CTG and District Rule 4681*

District Rule 4681 emission control requirements (carbon adsorption: 95% control efficiency and 85% capture efficiency; incineration: 90% control efficiency and 86% capture efficiency) are more stringent than the capture and control efficiency standards for each major source of VOC emissions from tire manufacturing recommended by the CTG. It is important to mention that there are no rubber tire manufacturing facilities currently operating in the District. If a new rubber tire manufacturing facility wants to operate in the District in the future, it will be evaluated for Best Available Control Technology and emission offset requirements pursuant to District Rule 2201 (New and Modified Stationary Source Review Rule). Based on the above discussion, District staff deems that District Rule 4681 satisfies RACT.

#### **B. EPA – Alternative Control Techniques (ACT) Document**

District staff's review of the EPA ACT list indicates that there is no ACT for rubber tire manufacturing.



**C. Standards of Performance for New Stationary Sources (NSPS)****1. 40 CFR 60 Subpart BBB (Standards of Performance for the Rubber Tire Manufacturing Industry)**

This NSPS applies to rubber tire manufacturing plants (each undertread cementing operation, each sidewall cementing operation, each tread end cementing operation, each bead cementing operation, each green tire spraying operation, each Michelin-A operation, each Michelin-B operation, and each Michelin-C automatic operation) that commence construction, modification, or reconstruction after January 20, 1983.

The NSPS requires operators to meet the following standards:

- Each Undertread Cementing Operation
  - Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or
  - Maintain total (uncontrolled) VOC use less than or equal to 8,531 lb VOC per 28 days, 8,846 lb VOC/29 days, 9,149 lb VOC per 30 days, 9,436 lb VOC per 31 days, or 10,670 lb VOC per 35 days.
- Each Sidewall Cementing Operation
  - Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or
  - Maintain total (uncontrolled) VOC use less than or equal to 7,099 lb VOC per 28 days, 7,363 lb VOC per 29 days, 7,606 VOC per 30 days, 7,870 lb VOC per 31 days, or 8,885 lb VOC per 35 days.
- Each Tread End Cementing Operation: Discharge no more than 10 grams (0.022 lb) VOC per bead cemented for each month.
- Each Bead Cementing Operation: Discharge no more than 5 grams (0.011 lb) VOC per bead cemented for each month.
- Each Green Tire Spraying Operation using only water based sprays: Discharge no more than 1.2 grams (0.0026 lb) VOC per tire sprayed with an inside green tire spray for each month and no more than 9.3 grams (0.021 lb) VOC per tire sprayed with an outside green tire spray each month.
- Each Green Tire Spraying Operation using only organic solvent-based sprays: Discharge no more than 25% of the VOC used (75% reduction) for each month; or maintain total (uncontrolled) VOC use less than or equal to 7,099 lb VOC per 28 days, 7,363 lb VOC per 29 days, 7,606 VOC per 30 days, 7,870 lb VOC per 31 days, or 8,885 lb VOC per 35 days.

- Each Green Tire Spraying Operation where both waterbased and organic solvent-based sprays are used: Discharge no more than 1.2 grams (0.0026 lb) VOC per tire sprayed with waterbased inside green tire spray for each month and no more than 9.3 grams (0.021 lb) VOC per tire sprayed with waterbased outside green tire spray for each month; and either discharge no more than 25% of the VOC used in organicsolvent-based green tire sprays (75% reduction) for each month or maintain total (uncontrolled) VOC use less than or equal to 7,099 lb VOC per 28 days, 7,363 lb VOC per 29 days, 7,606 VOC per 30 days, 7,870 lb VOC per 31 days, or 8,885 lb VOC per 35 days.
- Each Michelin-A Operation
  - Discharge no more than 35% of the VOC used (65% reduction) for each month; or
  - Maintain total (uncontrolled) VOC use less than or equal to 3,461 lb VOC per 28 days, 3,593 lb VOC per 29 days, 3,726 lb VOC per 30 days, 3,836 lb VOC per 31 days, or 4,343 lb VOC per 35 days.
- Each Michelin-B Operation
  - Discharge no more than 25% of the VOC used (75% reduction); or
  - Maintain total (uncontrolled) VOC use less than or equal to 2,888 lb VOC per 28 days, 2,998 lb VOC per 29 days, 3,086 lb VOC per 30 days, 3,197 lb VOC per 31 days, or 3,616 lb VOC per 35 days.
- Each Michelin-C Operation
  - Discharge no more than 55% of the VOC used (75% reduction); or
  - Maintain total (uncontrolled) VOC use less than or equal to 3,461 lb VOC per 28 days, 3,593 lb VOC per 29 days, 3,726 lb VOC per 30 days, 3,836 lb VOC per 31 days, or 4,343 lb VOC per 35 days.

Operators of each undertread cementing operation and each sidewall cementing operation in rubber tire manufacturing plants that commenced construction modification, or reconstruction after January 20, 1983 and before September 15, 1987 has the option of complying with Section 60.542a (alternate standard for VOC) which prohibits discharge into the atmosphere no more than 25 grams (0.55 lb) VOC per tire processed for each month if the operation uses 25 grams (0.055 lb) or less VOC per tire processed and does not employ a VOC emission reduction system.

#### *Comparison of NSPS and District Rule 4681*

District Rule 4681 emission control requirements overall, are more stringent than the NSPS standards. For undertread cementing operation, District rule 4641 requires an overall capture and control efficiency of at least 80% for carbon adsorption or 76% for incineration while the NSPS only require 75% emission reduction. For green tire spraying, District Rule 4681 only allows waterborne coating which contains no more than one percent by weight if based on formulation data or 10 grams/liter of coating, including water but less exempt compounds, if determined by testing, while the NSPS

allows the use of both waterbased and organic solvent-based coatings that meet certain requirements as discussed above. Although District Rule 4681 does not specify any emission standards for Michelin, the overall capture and control efficiency of District Rule 4681 is more stringent than NSPS emission reduction standard of 65% for Michelin-A, 75% for Michelin-B, and 65% for Michelin-C operations.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

NESHAPs and MACTs are requirements contained in 40 Code of Federal Regulations (CFR) Part 61 and 40 CFR Part 63. Since EPA has delegated the authority to implement NESHAP requirements to the District, NESHAPs and MACTs promulgated by EPA are usually incorporated by reference into District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). It is important to mention that the District implements NESHAPs and MACTs by incorporating the emission standards as conditions of the Permits to Operate issued to affected sources.

##### *1. 40 CFR Part 63 Subpart XXXX (NESHAP for Rubber Tire Manufacturing)*

This NESHAP applies to a rubber tire manufacturing that is located at, or is a part of, a major source of HAP emission. A major source of HAP emission is any stationary source or group of stationary source within a contiguous area and is under a common control that emits or has the potential to emit considering controls, in the aggregate, a single HAP at a rate of 9.07 megagrams (10 tons) or more per year or any combination of HAP at a rate of 22.68 megagrams (25 tons) or more per year. This NESHAP does not apply if the primary product produced at the affected major source is subject to another subpart under this part 63 as of the effective date of this subpart, or start of the source, whichever is later; or if the rubber tire manufacturing affected source is a research and development facility whose primary purpose is to conduct research and development into new processes and products, where such a source is operated under the close supervision of technically trained personnel and is not engaged in the manufacture of products for commercial use for commercial sale in commerce, except in a de minimis manner. An affected source is a new affected source if a new construction if construction of the affected source commenced after October 18, 2000 and it meets the applicability criteria discussed above. An affected source is reconstructed if it meets the criteria as defined in 40 CFR Part 63 Subpart A Section 63.2. An affected source is existing if it is not a new or reconstructed.

This NESHAP specify emission limits for tire production, tire cord production, and puncture sealant application. For tire production or tire cord production, there are two compliance options: HAP constituent option or production-based option, both options have specified HAP limits. For puncture sealant application, there two compliance options: percent reduction option (measured as VOC emissions) or HAP constituent option. The percent reduction option includes operating limits for control devices. In

addition, the NSPS includes monitoring, operation, maintenance, recordkeeping and reporting requirements.

### *Comparison of NESHAP and District Rule 4681*

It is important to mention that the NESHAP HAP emission limits which are expressed in terms of mass (kg) of HAP per mass of cements, solvents, sealants or coatings used at the tire production operation are not directly comparable to the VOC limits of District rule 4681 because, some HAPs may be exempt VOCs, and some VOCs may be HAPs; therefore, there is no direct correlation between the NESHAP limit versus District Rule 4681 VOC limits. In addition, District Rule 4681 emission limits cannot be directly compared to the NESHAP limits because District Rule 4681 specify the limits for undertread cementing, green tire coating, bead cementing, and tread end cementing rule while the NESHAP specify the limits for tire production, tire cord production, and puncture sealant application.

### **III. How does District Rule 4681 compare to rules in other air districts?**

District staff compared District Rule 4641 with the rules of other California ozone nonattainment air districts' rules on rubber tire manufacturing. Except for the Bay Area Air Quality Management District, South Coast Air Quality Management District, Sacramento Metropolitan Air Quality Management Air District, and Ventura County Air Pollution Control District have no rules for this source category. The result of the analysis of the BAAQMD rule is discussed below.

#### *1. Bay Area Air Quality Management District (BAAQMD) Regulation 8 Rule 21 (Rubber Tire Manufacturing Operations) adopted March 5, 1980*

BAAQMD Regulation 8 Rule 21 limits the emissions of volatile organic compounds from pneumatic rubber tire manufacturing operations. The rule does not apply to operations applying new tread to used tires (exempts retread operations). For cementing and bead dipping operations, the rule requires the operation of an emission control system with at least 85% capture efficiency and 95% control efficiency. For green tire coating, the rule requires the use of waterbase (less than 3% VOC) coatings only or the operation of a collection system with at least 90% collection efficiency and a control device with at least 95% efficiency. An alternative compliance option, an operator may comply with the rule through an APCO-approved emission control plan provided the emissions of VOC, on a daily weighted average, is no greater than the amount which would result if the affected operations complied with the specified limits for cementing and bead dipping operation, and green tire coating operation. In addition to the emission limits, the rule requires containers for organic solvents or cements containing organic solvents to be covered at all times except when cleaning or adding or removing material, and any leaks must be repaired immediately.

*Comparison of BAAQMD Regulation 8 Rule 21 and District Rule 4681*

BAAQMD Regulation 8 Rule 21 exempts retread of used tires while District Rule 4681 does not have such exemption. BAAQMD Regulation 8 Rule 21 green tire coating requirements allow the use of waterbase coating with a VOC content of no more than 3% or operate an emission control system with at least 85% capture efficiency and 95% control efficiency. In contrast, District Rule 4681 only allows the use of waterbase coating with no more than 1% by weight which is more stringent than BAAQMD Regulation 8 Rule 21 VOC limit of 3%. Both BAAQMD Regulation 8 Rule 21 and District Rule 4681 have the same emission control system capture and control efficiencies for cementing and bead dipping operations. Based on the above discussion, District staff deems that overall, District Rule 4681 is as stringent as BAAQMD Regulation 8 Rule 21.

**IV. Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4681 satisfies RACT for rubber tire manufacturing. It is important to mention that there are no existing rubber tire manufacturing facilities currently operating in the District. A new rubber tire manufacturing facility that would like to operate in the District will be evaluated for Best Available Control Technology and emission offset requirements pursuant to District Rule 2201 (New and Modified Stationary Source Review Rule). Based on the above discussion, District staff deems that District Rule 4681 satisfies RACT.

## Rule 4682 – Polystyrene, Polyethylene, and Polypropylene Products Manufacturing

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0.128	0.143	0.154	0.157	0.165	0.175	0.185	0.194
VOC	0.32	0.35	0.37	0.39	0.43	0.46	0.49	1.39

(Source: District 2007 Ozone Plan)

### District Rule 4682 Description:

The purpose of this rule is to limit emissions of VOC and trichlorofluoromethane (CFC-11) and dichlorofluoromethane (CFC-12) from manufacturing and processing of products composed of polystyrene, polyethylene, or polypropylene and from the storage of VOC blowing agents. The provisions of this rule shall apply to any manufacturing, processing, and storage of products composed of polystyrene, polyethylene, or polypropylene. The provisions of this rule shall not apply to manufacturing and processing operations using polymeric materials containing less than 1 percent volatile organic compounds by weight, and not using a blowing agent in their process.

District Rule 4682 requires that no facility shall operate controllable VOC emission sources at a polystyrene foam, polyethylene, or polypropylene manufacturing or processing operation unless one of the following VOC emission reduction methods is provided:

- A blowing agent other than a VOC or trichlorofluoromethane (CFC-11) or dichlorodifluoromethane (CFC-12) is exclusively used; or
- A system designed to achieve at least 90 percent VOC capture efficiency, and a thermal oxidizer which abates captured VOC emissions by at least 95 percent by weight; or
- VOC emissions are controlled by a method which achieves an emission reduction equivalent to Section 5.1.2 and which does not include the use of trichlorofluoromethane (CFC-11) or dichlorodifluoromethane (CFC-12), and is approved by the APCO.

On September 20, 2010, operations shall not conduct any manufacturing operations, as defined in Section 3.0, unless one of the following emission reduction methods is met:

- The operator demonstrates, to the satisfaction of the APCO, that the total product emissions do not exceed 2.4 pounds of VOC per 100 pounds of total material processed, calculated over a monthly period.
- A blowing agent other than a VOC or trichlorofluoromethane (CFC-11) or dichlorofluoromethane (CFC-12) is exclusively used.
- An approved emission control system is installed and operating with manufacturing emissions vented only to the approved emission control system;

and emissions from the final manufactured product are to be vented only to the approved emission control system. The rule requires that the control device shall have a capture and control efficiency of 93%. This is greater than the previous emission control system requirements of 90% capture and 95% control (85.5% capture and control efficiency).

- The operator demonstrates to the satisfaction of the APCO that the manufacturing emissions are no greater than the facility emissions which would occur under Section as calculated according to Section 5.5, and which does not include the use of trichlorofluoromethane (CFC-11) or dichlorodifluoromethane (CFC-12).

### **How does District Rule 4682 compare with federal rules and regulations?**

#### *1. EPA – Control Technique Guidelines (CTG)*

EPA-450/3-83-006 Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins.

The CTG applies to equipment in process units operated to produce one or more of the synthetic organic chemicals listed in Appendix E of the proposed standards of performance for SOCOMI (46 FR 1136, January 5, 1981), methyl tert-butyl ether (MTBE), polyethylene, polypropylene, and polystyrene. District Rule 4682 applies to the manufacturing, processing, and storage of products composed of polystyrene, polyethylene, or polypropylene. Since the CTG applies to the manufacturing of polyethylene, polypropylene, and polystyrene, and District Rule 4682 applies to the manufacturing of products made with polyethylene, polypropylene, and polystyrene, these two regulations are not regulating the same equipment. Therefore, this CTG and District Rule 4682 will not be compared.

EPA-450/3-83-008 Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins.

This CTG covers the polymers and resins industry. The polymers and resins industry includes operations that convert monomer or chemical intermediate materials obtained from the basic petrochemical industry and the synthetic organic chemicals manufacturing industry into polymer products. Such products include plastic materials, synthetic resins, synthetic rubbers, and organic fibers.

This CTG states that the following emission reductions or limitations are considered representative of RACT:

- For polypropylene plants using liquid phase processes: a 98 weight percent reduction or reduction to 20 ppm of continuous VOC emissions from the polymerization reaction section (i.e., reactor vents), the material recovery section (i.e., decanter vents, neutralizer vents, by-product and diluent recovery operations vents), and the product finishing section (i.e., dryer vents and extrusion and pelletizing vents).

- For high-density polyethylene plants using liquid phase slurry processes: a 98 weight percent reduction or reduction to 20 ppm of continuous VOC emissions from the material recovery section (i.e., ethylene recycle treater vents) and the product finishing section (i.e., dryer vents and continuous mixer vents).
- For polystyrene plants using continuous processes: an emission limit of 0.12 kg VOC/1,000 kg product from the material recovery section (i.e., product devolatilizer system).

District Rule 4682 requires that the operators use a blowing agent that does not contain VOCs or use a control system that has a comparable capture and control efficiency that is discussed as RACT in this CTG. Therefore, District Rule 4682 and this CTG have equivalent emission limiting requirements.

## 2. *EPA – Alternative Control Technology (ACT)*

EPA-450/3-90-020 Control of VOC Emissions From Polystyrene Foam Manufacturing.

The purpose of this study was to conduct a survey of the polystyrene foam manufacturing industry to characterize the industry, define the nature and scope of volatile organic compound (VOC) emissions from this source category, identify potential controls for reducing VOC emissions, and develop cost estimates for VOC capture and control technologies.

This ACT lists the following major findings concerning VOC emission controls: Incineration and carbon adsorption have been demonstrated as readily available add-on control technology for reducing VOC emissions, and the use of alternative blowing agents in place of CFC and hydrocarbon blowing agents has been implemented. Since District Rule 4682 requires that the facility either exclusively uses a blowing agent that is not a VOC, CFC-11 or CFC-12, or installs an approved control device to control VOC emission, the requirements of District Rule 4682 are equivalent to the ACT.

## 3. *Standards of Performance for New Stationary Sources (NSPS)*

Subpart DDD — Standards of Performance for Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry.

The provisions of this subpart apply to affected facilities involved in the manufacture of polypropylene, polyethylene, polystyrene, or poly (ethylene terephthalate). The affected facilities designated below for polypropylene and polyethylene are inclusive of all equipment used in the manufacture of these polymers, beginning with raw materials preparation and ending with product storage, and cover all emissions emanating from such equipment.

This subpart requires the following actions be taken from various different types of



operations:

Polypropylene, low density polyethylene, and high density polyethylene Continuous Emissions:

Operations shall reduce emissions of total organic compounds (minus methane and ethane) (TOC) by 98 weight percent, or to a concentration of 20 parts per million by volume (ppmv) on a dry basis, whichever is less stringent. In addition, the facility may control VOC emissions by combusting the exhaust in a boiler or steam generator with a heat input greater than 150 MMBtu/hr or combust in a flare.

Polypropylene, low density polyethylene, and high density polyethylene Intermittent Emissions:

Operations shall control VOC emissions by combusting the exhaust in a boiler or steam generator or combust in a flare.

Polystyrene:

Operators shall show not allow continuous TOC emissions to be greater than 0.0036 kg TOC/Mg (0.0072 lb TOC/ton) product; or allow the outlet gas stream temperature from each final condenser in the material recovery section to exceed  $-25^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$ ).

Polyethylene:

Each owner or operator of a PET process line using a dimethyl terephthalate process shall limit the continuous TOC emissions from the material recovery section (i.e., methanol recovery) or limit the continuous TOC emissions and, if steam-jet ejectors are used to provide vacuum to the polymerization reactors, the ethylene glycol concentration from the polymerization reaction section by complying with the appropriate standard set forth below.

Each owner or operator of a PET process line using a terephthalic acid process shall not allow the continuous TOC emissions from the esterification vessels in the raw materials preparation section to be greater than 0.04 kg TOC/Mg (0.08 lb TOC/ton) product or shall limit the continuous TOC emissions and, if steam-jet ejectors are used to provide vacuum to the polymerization reactors, the ethylene glycol concentration from the polymerization reaction section by complying with the appropriate standard set forth below.

District Rule 4682 requires that no facility shall operate controllable VOC emission sources at a polystyrene foam, polyethylene, or polypropylene manufacturing or processing operation unless one of the following VOC emission reduction methods is provided:

- A blowing agent other than a VOC or trichlorofluoromethane (CFC-11) or dichlorodifluoromethane (CFC-12) is exclusively used; or
- A system designed to achieve at least 90 percent VOC capture efficiency, and a thermal oxidizer which abates captured VOC emissions by at least 95 percent by weight; or

- VOC emissions are controlled by a method which achieves an emission reduction equivalent to Section 5.1.2 and which does not include the use of trichlorofluoromethane (CFC-11) or dichlorodifluoromethane (CFC-12), and is approved by the APCO.

On and after September 20, 2010, the requirements to meet compliance with District Rule 4682 will become more stringent. The current requirements are as stringent as the requirements of Subpart DDD, therefore the increase in the stringency of the rule will assure that District Rule 4682 remains as stringent as Subpart DDD.

Subpart DDD requires the following monitoring requirements:

- Whenever a particular item of monitoring equipment is specified in this section to be installed, the owner or operator shall install, calibrate, maintain, and operate according to manufacturer's specifications.
- The owner or operator shall install, as applicable, the monitoring equipment for the control means used to comply with §60.562–1, except §60.562–1(a)(1)(i)(D).
- Owners or operators of control devices used to comply with the provisions of this subpart, except §60.562–1(a)(1)(i)(D), shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs.
- An owner or operator complying with the standards specified under §60.562–1, except §60.562–1(a)(1)(i)(D), with control devices other than an incinerator, boiler, process heater, flare, absorber, condenser, or carbon adsorber or by any other means shall provide to the Administrator information describing the operation of the control device and the process parameter(s) which would indicate proper operation and maintenance of the device. The Administrator may request further information and will specify appropriate monitoring procedures or requirements.

District Rule 4682 requires monitoring requirements and recordkeeping requirements that are as stringent as Subpart DDD. Therefore the requirements of District Rule 4862 are as stringent as Subpart DDD.

### **How does District Rule 4682 compare to rules in other air districts?**

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4682 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1175, as amended September 7, 2007
- Bay Area AQMD Regulation 8 Rule 52, as adopted July 7, 1999
- Sacramento Metro AQMD does not have a specific prohibitory rule for this source category.
- Ventura County APCD does not have a specific prohibitory rule for this source category.

*1. South Coast AQMD Rule 1175*

South Coast AQMD Rule 1175 (Control of Emissions From the Manufacture of Polymeric Cellular (Foam) Products) applies to polymeric cellular products manufacturing operations including but not limited to expandable polystyrene, polystyrene foam extrusion, polyurethane, isocyanurate and phenolic foam operations. All steps of the manufacturing operation and the storage of the final product for a maximum of 48 hours. District Rule 4682 is application to the same types of operations.

SCAQMD Rule 1175 defines an approved emission control system as a system that captures 90% of the manufacturing and storage emissions, and reduces 95% of the emissions captured. District Rule 4682 has the same definition for an approved emission control system.

SCAQMD Rule 1175 requires that manufacturing operations excluding expandable polystyrene mold operations discontinue the use of CFCs, VOCs, or methylene chloride and to reduce their annual emissions from their 1988 emissions baseline by 100% by 1994. SCAQMD Rule 1175 also requires that expandable polystyrene molding operations demonstrate that the manufacturing emissions and post-manufacturing emissions are less than 2.4 lbs/100 lbs of raw material processed. District Rule 4682 states that starting September 20, 2010, the facility shall show compliance with the rule by either demonstrating that the manufacturing emissions and post-manufacturing emissions are less than 2.4 lbs/100 lbs of raw material processed, a blowing agent other than a VOC or CFC is exclusively used or an approved emission control system is installed and operating. District Rule 4682 has equivalent requirements to the requirements of SCAQMD Rule 1175 therefore these two rules have equivalent emissions requirements.

In addition, the monitoring and testing requirements of SCAQMD Rule 1175 are equivalent to that of District Rule 4682.

*2. Bay Area AQMD Regulation 8 Rule 52*

Bay Area AQMD Regulation 8 Rule 52 (Polystyrene, Polypropylene, and Polyethylene Foam Product Manufacturing Operations) applies to the manufacturing of foam products composed of polystyrene, polyethylene or polypropylene. District Rule 4682 is application to the same types of operations.

BAAQMD Reg 8 Rule 52 states that polystyrene foam product manufacturing operations shall not manufacture polystyrene foam products within the District unless, for each 100 pounds of raw material processed, VOC emissions, which include emissions from the product manufacturing operation and residual blowing agent in the finished foam product, do not at any time exceed:

- 2.8 pounds for expandable polystyrene cup molding product manufacturing operations; or

- 2.7 pounds for expandable polystyrene shape and block molding product manufacturing operations; or
- 2.4 pounds for loose fill product manufacturing operations; or
- 2.4 pounds for extruded polystyrene foam board and sheet product manufacturing operations.

District Rule 4682 states that starting September 20, 2010, the facility shall show compliance with the rule by either demonstrating that the manufacturing emissions and post-manufacturing emissions are less than 2.4 lbs/100 lbs of raw material processed. Since this is the lowest limit listed by BAAQMD Reg 8 Rule 52, the emission requirements of District Rule 4682 is as stringent as the BAAQMD rule.

BAAQMD Reg 8 Rule 52 states that a person shall not manufacture polyethylene or polypropylene foam products within the District unless at least 85% by weight of the VOC emissions from the product manufacturing operation are captured and vented to an abatement device with a control efficiency of at least 98% by weight at all times. District Rule 4682 states that an approved emission control system is a system that captures 90% of the manufacturing and storage emissions, and reduces 95% of the emissions captured. Therefore, the emission control system requirements of District Rule 4682 are equivalent to that of BAAQMD Reg 8 Rule 52.

BAAQMD Reg 8 Rule 52 requires that the facility maintain the type of resin(s) and blowing agent(s) used in product manufacturing operations, the amount of polymerized styrene, ethylene, propylene, and blowing agent in each resin formulation used in percent by weight as indicated by the specifications of the foam product manufacturer, and the manufacturer or supplier of the raw polymeric material. In addition, monthly records of the amount of each raw polymeric material processed, the amount of each finished foam product manufactured, the amount of each VOC blowing agent used, and the hours of operation shall be maintained. Since District Rule 4682 has similar monitoring and recordkeeping requirements, it can be considered equivalent to BAAQMD Reg 8 Rule 52.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4682 satisfies RACT for polystyrene, polyethylene, and polypropylene manufacturing operations.

## Rule 4684 – Polyester Resin Operations

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
VOC	0.35	0.38	0.40	0.40	0.47	0.49	0.52	0.72

(Source: District 2007 Ozone Plan)

### District Rule Description:

This rule includes commercial and industrial polyester resin operations, organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials associated with such operations. The polyester resin users typically are making composite materials, meaning mixing the resin with glass fiber to make a product. This rule also covers manufacturers of boats and yachts as well as those making fiberglass shower units. Polyester resin operations that used less than 20 gallons per month are exempt from the requirements of this rule.

This rule requires polyester resin operations to use low-VOC polyester resins with the following monomer content: Low VOC resins, except for specialty resins and gel coats, contain no more than 35% monomer by weight. Low VOC pigmented gel coats contain no more than 45% monomer by weight. Low VOC specialty resins and clear gel coats, contain no more than 50% monomer by weight; or use resin containing a vapor suppressant, such that the weight loss from the VOC emissions does not exceed 60 grams per square meter of exposed surface during resin polymerization; or use a closed-mold system; or install and operate a VOC emissions control system.

### How does District Rule 4684 compare with federal rules and regulations?

1. *EPA – Control Technique Guidelines (CTG)*

EPA-450/3-83-006 Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins.

The CTG applies to equipment in process units operated to produce one or more of the synthetic organic chemicals listed in Appendix E of the proposed standards of performance for SOCOMI (46 FR 1136, January 5, 1981), methyl tertiary-butyl ether (MTBE), polyethylene, polypropylene, and polystyrene. District Rule 4684 applies to commercial and industrial polyester resin operations, organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials associated with such operations. Since the CTG applies to the manufacturing of polyethylene, polypropylene, and polystyrene, and District Rule 4684 applies to the manufacturing of products made

with polyester resin, these two regulations are not regulating the same equipment. Therefore, this CTG and District Rule 4684 will not be compared.

**EPA-450/3-83-008 Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins.**

This CTG covers the polymer and resin industry. The polymer and resin industry includes operations that convert monomer or chemical intermediate materials obtained from the basic petrochemical industry and the synthetic organic chemicals manufacturing industry into polymer products. Such products include plastic materials, synthetic resins, synthetic rubbers, and organic fibers. This CTG only addresses the control of emissions from high-density polyethylene, polypropylene, and polystyrene resin operations. District Rule 4684 only addresses emissions from polyester resin operations. Therefore these two regulations are not applicable to the same equipment and will not be compared.

**EPA-453/R-08-004 Control Technique for Fiberglass Boat Manufacturing Materials**

This CTG provides control recommendations for reducing VOC emissions from the use of gel coats, resins, and materials used to clean application equipment in fiberglass boat manufacturing operations.

The CTG lists the available controls options for resin and gel coat as follows:

- Low monomer VOC resins and gel coats.
- Vapor suppressed resins and gel coats.
- Non-atomizing resin applications.
- Closed Molding.
- Add on control systems.

The CTG requires the following in order to meet the recommended open molding resin and gel coat limits: (1) achieve the individual monomer VOC content limit through the use of low-monomer VOC materials, either by using only low monomer VOC materials within a covered operation, or by averaging the monomer VOC contents for all materials used within an operation on a weight-adjusted basis; (2) meet the numerical monomer VOC emission rate limits, which would enable a facility to average emissions among different operations using equations to estimate monomer VOC emission rates from each operation based on the material and application method; or (3) use add-on controls to achieve a numerical monomer VOC emission rate that is determined for each facility based on the mix of application methods and materials used at that facility.

The CTG's limitations for open molding operations are listed in the table below. These are also the same limitations found in 40 CFR 63 Subpart VVVV.

Organic HAP Content Requirements		
Operation Type	Application Method	Organic HAP content (weight percent) requirement
Production Resin Operations	Atomized	28
Production Resin Operations	Nonatomized	25
Pigmented Gel Coat Operations	Any method	33
Clear Gel Coat	Any method	48
Tooling Resin Operations	Atomized	30
Tooling Resin Operations	Nonatomized	39
Tooling Gel Coat Operations	Any Method	40

District Rule 4684 contains requirements that would require a polyester resin operation to either use resins and gel coats that meet monomer content limits or install an add on emission control device. As shown in the table above, the monomer content limits of the CTG are more stringent than those of District Rule 4684. The add on emission control device requirements are equivalent for both regulations.

2. *EPA – Alternative Control Technology (ACT)*

There is no ACT for this source category.

3. *Standards of Performance for New Stationary Sources (NSPS)*

There is no NSPS for this source category.

4. *National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)*

Subpart VVVV—National Emission Standards for Hazardous Air Pollutants for Boat Manufacturing

This subpart establishes national emission standards for hazardous air pollutants (HAP) for new and existing boat manufacturing facilities with resin and gel coat operations, carpet and fabric adhesive operations, or aluminum recreational boat surface coating operations. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission standards. The applicability of this subpart is equivalent to that of District Rule 4684.

Subpart VVVV states that you may show compliance with the subpart by using one of the following options for the resins and gel coats used in open molding operations at your facility:

- (a) **Maximum achievable control technology (MACT) model point value averaging (emissions averaging) option.** (1) Demonstrate that emissions from the open molding resin and gel coat operations that you average meet the emission limit

in §63.5698 using the procedures described in §63.5710. Compliance with this option is based on a 12-month rolling average.

(2) Those operations and materials not included in the emissions average must comply with either paragraph (b) or (c) of this section.

**(b) Compliant materials option.** Demonstrate compliance by using resins and gel coats that meet the organic HAP content requirements in Table 2 to this subpart. Compliance with this option is based on a 12-month rolling average.

**(c) Add-on control option.** Use an enclosure and add-on control device, and demonstrate that the resulting emissions meet the emission limit in §63.5698. Compliance with this option is based on control device performance testing and control device monitoring.

This Subpart's limitations for open molding operations are listed in the table below.

Organic HAP Content Requirements		
Operation Type	Application Method	Organic HAP content (weight percent) requirement
Production Resin Operations	Atomized	28
Production Resin Operations	Nonatomized	25
Pigmented Gel Coat Operations	Any method	33
Clear Gel Coat	Any method	48
Tooling Resin Operations	Atomized	30
Tooling Resin Operations	Nonatomized	39
Tooling Gel Coat Operations	Any Method	40

District Rule 4684 contains requirements that would require a polyester resin operation to either use resins and gel coats that meet monomer content limits or install an add on emission control device. As shown in the table above, the monomer content limits of Subpart VVVV are more stringent than those of District Rule 4684. The add on emission control device requirements are equivalent for both regulations.

Subpart VVVV requires that monthly records of the resin and gel coats used be maintained. District Rule 4684 requires that these records be maintained on a daily basis. District Rule 4684 has more stringent recordkeeping requirements than Subpart VVVV.

### How does District Rule 4684 compare to rules in other air districts?

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4684 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1162, as amended July 2005
- Bay Area AQMD Regulation 8 Rule 50, as adopted November 1996



- Sacramento Metro AQMD Rule 465, as amended September 2008
- Ventura County APCD Rule 74.14, as amended April 2005.

### **1. South Coast AQMD Rule 1162**

South Coast AQMD Rule 1162 (Polyester Resin Operations) applies to all polyester resin operations that fabricate, rework, repair, or touch-up products for commercial, military, or industrial use including, but not limited to, boats, tubs, pools, shower enclosures, spas, bathroom fixtures, jigs, tools, molds, building panels, air pollution control equipment, sewage treatment equipment, storage tanks, transportation parts, automotive, aircraft, and aerospace components, and other industrial and consumer products. District Rule 4684 is applicable to the same types of operations, however District Rule 4684 also contains an exemption for facilities which use less than 20 gallons of polyester resin per month. The applicability of these two rules are equivalent.

South Coast AQMD Rule 1162 and District Rule 4684 have the same application method requirements: airless, air assisted airless, high-volume, low-pressure (HVLP) spray equipment, or electrostatic spray equipment. The application methods for these two rules are equivalent.

South Coast AQMD Rule 1162 requires that the polyester resin material in an open molding system shall not exceed the following monomer percentage by weight as applied: clear gel coat for marble resins (40%), clear gel coat for other resins (44%), pigmented gel coat white and off white (30%), pigmented gel coat non-white (37%), pigmented gel coat primer (28%), specialty gel coat (48%), general purpose marble resin (10%), general purpose solid surface resin (17%), general purpose tub/shower resin (24%), lamination resin (32%), other general purpose resin (35%). District Rule 4684 requires that clear gel coats contain no more than 50% monomer by weight, pigmented gel coats contain no more than 45% monomer by weight, and general purpose resins contain no more than 35% monomer by weight. Since District Rule 4684 has a higher monomer percentage by weight limit than SCAQMD Rule 1162, the resin monomer percentage by weight limits of District Rule 4684 are not as stringent as SCAQMD Rule 1162.

SCAQMD Rule 1162 has a more stringent vapor suppressed resin requirement when compared to District Rule 4684. SCAQMD Rule 1162 requires additives to reduce VOC evaporation loss to less than 50 g/m<sup>2</sup> of surface area, while District Rule 4684 requires additives to reduce VOC evaporation loss to less than 60 g/m<sup>2</sup> of surface area

SCAQMD Rule 1162 has a more stringent control equipment requirement when compared to District Rule 4684. SCAQMD Rule 1162 requires an emission control system to have an overall capture and control efficiency of 90 percent or more on a mass basis, while District Rule 4684 requires an emission control system to have an overall capture and control efficiency of 85 percent or more on a mass basis.

SCAQMD Rule 1162 and District Rule 4684 have equivalent recordkeeping, monitoring, and testing requirements.

## **2. Bay Area AQMD Regulation 8 Rule 50**

BAAQMD Regulation 8 Rule 50 (Polyester Resin Operations) applies to all facilities that manufacture products using polyester resins. District Rule 4684 is applicable to the same types of operations, however District Rule 4684 also contains an exemption for facilities which use less than 20 gallons of polyester resin per month. The applicability of these two rules are equivalent.

BAAQMD Regulation 8 Rule 50 requires an operation to use one or more of the following emission reducing methods: 1) Use polyester resin material with a monomer content of no greater than 35 percent by weight. 2) Use a resin containing vapor suppressant, such that weight loss from VOC emissions do not exceed 60 grams per square meter of exposed surface area during resin polymerization. 3) Use a closed-mold system. District Rule 4684 has equivalent requirements for options 2 and 3, however it has a higher limit for the monomer content of polyester resin used. District Rule 4684 it is not as stringent as BAAQMD Regulation 8 Rule 50.

BAAQMD Regulation 8 Rule 50 and District Rule 4684 have the same spray application method requirements: airless, air assisted airless, high-volume, low-pressure (HVLP) spray equipment, or electrostatic spray equipment. The application methods for these two rules are equivalent.

BAAQMD Regulation 8 Rule 50 and District Rule 4684 both require an emission control system to have an overall capture and control efficiency of 85 percent or more on a mass basis.

BAAQMD Regulation 8 Rule 50 limits the cleaning materials used by the polyester resin operation to less than 200 g-VOC/L. District Rule 4684 limits the VOC content of clean up solvents to 25 g-VOC/L. District Rule 4684 has more stringent surface preparation and clean-up solvent requirements than BAAQMD Regulation 8 Rule 50.

BAAQMD Regulation 8 Rule 50 and District Rule 4684 have equivalent recordkeeping, monitoring, and testing requirements.

## **3. Sacramento Metro AQMD Rule 465**

Sacramento Metro AQMD Rule 465 (Polyester Resin Operations) applies to all facilities that operate polyester resins operations except for facilities that use less than 20 gallons of resin per month. District Rule 4684 is applicable to the same types of operations and has the same exemption. The applicability of these two rules are equivalent.

The process and control requirements of Sacramento Metro AQMD Rule 465 are almost equivalent to the requirements of District Rule 4684. The one difference is that Sacramento Metro AQMD Rule 465 requires that the VOC control system provide an overall system efficiency of 90% compared to 85% which is required by District Rule 4684. The control efficiency of District Rule 4684 it is not as stringent as that of Sacramento Metro AQMD Rule 465.

Sacramento Metro AQMD Rule 465 and District Rule 4684 have the same spray application method requirements: airless, air assisted airless, high-volume, low-pressure (HVLP) spray equipment, or electrostatic spray equipment. The application methods for these two rules are equivalent.

The cleaning material requirements of Sacramento Metro AQMD Rule 465 states that on September 25, 2009, all cleaning materials shall have VOC contents of 0.21 pounds of VOC per gallon (25 g/l) as applied, or less. District Rule 4684 currently requires cleaning materials to have VOC contents of 0.21 pounds of VOC per gallon (25 g/l) as applied, or less. District Rule 4684 has more stringent cleaning material requirements than Sacramento Metro AQMD Rule 465.

Sacramento Metro AQMD Rule 465 requires that monthly records of the resin and cleaning materials be maintained for operations with VOC emissions greater than 5 tons-VOC/year and annual records be maintained for operations with VOC emissions with less than 5 ton-VOC/year. District Rule 4684 requires that these records be maintained on a daily basis. District Rule 4684 has more stringent recordkeeping requirements than Sacramento Metro AQMD Rule 465.

#### **4. *Ventura County APCD Rule 74.14***

Ventura County APCD Rule 74.14 (Polyester Resin Material Operations) applies to all facilities that operate polyester resins operations except for facilities that use less than 20 gallons of resin per month. District Rule 4684 is applicable to the same types of operations and has the same exemption. The applicability of these two rules are equivalent.

Ventura County APCD Rule 74.14 requires that the polyester resin material in an open molding system shall not exceed the following monomer percentage by weight as applied: clear gel coat for marble resins (40%), clear gel coat for other resins (44%), pigmented gel coat white and off white (30%), pigmented gel coat non-white (37%), pigmented gel coat primer (28%), specialty gel coat (48%), general purpose marble resin (10%), general purpose solid surface resin (17%), general purpose tub/shower resin (24%), lamination resin (32%), other general purpose resin (35%). District Rule 4684 requires that clear gel coats contain no more than 50% monomer by weight, pigmented gel coats contain no more than 45% monomer by weight, and general purpose resins contain no more than 35% monomer by weight. Since District Rule 4684 has a higher monomer percentage by weight limit than Ventura County APCD

Rule 74.14, the resin monomer percentage by weight limits of District Rule 4684 are not as stringent as Ventura County APCD Rule 74.14.

Ventura County APCD Rule 74.14 and District Rule 4684 have the same spray application method requirements: airless, air assisted airless, high-volume, low-pressure (HVLP) spray equipment, or electrostatic spray equipment. The application methods for these two rules are equivalent.

The cleaning material requirements of Ventura County APCD Rule 74.14 states that all cleaning materials shall be either a Clean Air Solvent or shall not exceed 25 grams ROC per liter of material as applied. District Rule 4684 currently requires cleaning materials to have VOC contents of 0.21 pounds of VOC per gallon (25 g/l) as applied, or less. The cleaning material requirements for these two rules are equivalent.

Ventura County APCD Rule 74.14 requires that the VOC control system provide an overall system efficiency of 90% compared to 85% which is required by District Rule 4684. The control efficiency of District Rule 4684 it is not as stringent as that of Ventura County APCD Rule 74.14.

Ventura County APCD Rule 74.14 requires that monthly records of the resin and cleaning materials be maintained. District Rule 4684 requires that these records be maintained on a daily basis. District Rule 4684 has more stringent recordkeeping requirements than Ventura County APCD Rule 74.14.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that the recently adopted CTG has several requirements that are more stringent than those in Rule 4684 for polyester resin operations. Although Rule 4684 limits are not as stringent as some of those contained within other district's rules, those rules have been recently amended and some of their limits are considered beyond RACT, since those requirements are more stringent than the CTG requirements. Since the CTG was recently adopted (2008), EPA would have conducted a thorough analysis for determining the reasonably available control to apply to the source category. Therefore, although RACT is inherently a "moving target", a recently adopted CTG can be assumed as defining RACT. As discussed in Section 4.2 and Table 4-3 below, the rule is on a schedule for addressing the differences between its current requirements versus the CTG and the other rule requirements.

## Rule 4691 – Vegetable Oil Processing Operations

### **Emissions Inventory:**

Tons per day – summer season

<b>Pollutant</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2020</b>	<b>2023</b>
VOC	0.36	0.37	0.40	0.40	0.44	0.46	0.48	0.48

(Source: District 2007 Ozone Plan)

### **District Rule 4691 Description**

This rule controls VOC emissions from facilities that extract oil from vegetable sources like cottonseeds and corn.

### **How does District Rule 4691 compare with federal rules and regulations?**

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There are no NESHAPs for this source category.

### **How does District Rule 4691 compare to rules in other air districts?**

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4691 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD does not have a specific prohibitory rule for this source category.
- Bay Area AQMD Regulation 8 Rule 41, as adopted December 1986.

- Sacramento Metro AQMD does not have a specific prohibitory rule for this source category.
- Ventura County APCD does not have a specific prohibitory rule for this source category.

### **Bay Area AQMD Regulation 8 Rule 41**

Bay Area AQMD Regulation 8 Rule 41 (Vegetable Oil Manufacturing Operations) applies to vegetable oil solvent extraction operations. Equipment that is used exclusively for research, laboratory analysis or determination of production is exempt from the emission control requirements of this rule.

District Rule 4691 is applicable to all vegetable oil plants.

Both BAAQMD Regulation 8 Rule 41 and District Rule 4691 have identical requirements for the control of emissions from both an extractor, desolventizer-toaster, and a desolventizer-toaster conveyor, cooler or tumbler. In addition, both rules have identical monitoring and recordkeeping requirements.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4691 satisfies RACT for vegetable oil plants.

## Rule 4692 – Commercial Charbroiling

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	0	0	0	0	0	0	0	0
VOC	0.442	0.461	0.484	0.491	0.526	0.547	0.569	0.613

(Source: District 2007 Ozone Plan)

### District Rule 4692 Description

This source category includes charbroiling equipment located in restaurants, including hospitals, educational institutions, military, and government facilities. The rule applies to commercial cooking operations utilizing chain-driven (conveyorized) charbroilers that grill at least 875 pounds of meat per week. Operators with units that emit less than one pound of pollutant per day of criteria pollutant are exempt.

### How does District Rule 4692 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this source category.

### How does District Rule 4692 compare to rules in other air districts?

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4692 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1138, as adopted November 1997
- Bay Area AQMD Regulation 6 Rule 2, as adopted December 2007
- Ventura County APCD Rule 74.25, as adopted October 2004
- Sacramento Metro AQMD has no prohibitory rule for this source category.

#### **A. South Coast AQMD Rule 1138**

South Coast AQMD Rule 1138 (Commercial Charbroiling) requires that a chain-driven charbroiler be operated with either a certified catalytic oxidizer or other control device. The alternative control device must be as or more effective than the catalytic oxidizer in reducing particulate matter (PM) and VOC emissions. The rule does not specify a particular PM or VOC emission rate or a control efficiency for the charbroiler/control device combination. The minimum requirement for certification is contained in the test protocol. The catalytic oxidizer must reduce emissions of VOC and PM by at least 83%. District Rule 4692 essentially mirrors the South Coast AQMD rule by requiring a South Coast AQMD certified catalytic oxidizer.

#### **B. Bay Area AQMD Regulation 6 Rule 2**

Bay Area AQMD Regulation 6 Rule 2 (Commercial Cooking Equipment) was adopted in December 2007. The rule applies to both chain-driven charbroilers and to under-fired charbroilers. There are exemptions for facilities that buy less than a certain amount of meat per week and for facilities that grill less than a certain amount per week.

For chain-driven charbroilers, there are both PM and VOC emission rate limits. Since PM is not an ozone precursor, the allowable PM emission rate is not part of this RACT analysis. The VOC emission rate for chain-driven charbroilers represents an 83% reduction over Bay Area AQMD's uncontrolled emission factor for the grilling of beef. This mirrors the criteria for South Coast AQMD certification. For under-fired charbroilers, there are PM emission rate limits, but no VOC emission rate limits, so the rule does not define applicable RACT for under-fired charbroilers. The Bay Area AQMD rule is equivalent to District Rule 4692 for chain-driven charbroilers.

#### **C. Ventura County APCD Rule 74.25**

Ventura County APCD Rule 74.25 applies to conveyORIZED (chain-driven) charbroilers. There is one exemption that applies only to chain-driven charbroilers placed in service before October 12, 2005. If these units grill less than 875 pound of meat or less per week, they are exempt from the control requirements. Catalytic oxidizers or other control device is required for these units. The control device must be certified as reducing PM and reactive organic compound emissions by at least 83% when tested according to South Coast AQMD's test protocol. The VOC emission reduction requirement represents the minimum emission reduction required for certification under the South Coast AQMD test protocol for catalytic oxidizers. District Rule 4692 requires South Coast AQMD-certified catalytic oxidizer for chain-driven charbroilers. Since the



83% reduction is the minimum reduction for certification, the control requirements in District Rule 4692 and Ventura County APCD Rule 74.25 are equivalent.

**Conclusion**

There are no federal rules or regulations covering emissions from this source category. After careful evaluation of prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4692 satisfies RACT for commercial charbroilers.

## Rule 4693 – Bakery Ovens

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	0.52	0.54	0.56	0.57	0.61	0.63	0.66	0.66

(Source: District 2007 Ozone Plan)

### District Rule 4693 Description

This rule includes all bakery ovens at Major Sources that are used for the baking of yeast leavened products.

### How does District Rule 4693 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

*EPA-453/R-92-017 Alternative Control Technology Document for Bakery Oven Emissions*

This document outlines the available control techniques for bakery ovens. The document lists no specific VOC emission limit, although it does suggest estimated percent VOC reduction from uncontrolled levels. In not having a specific VOC limit for any of the bakery ovens, the document does not define RACT for bakery ovens.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP for this source category.

## **How does District Rule 4693 compare to rules in other air districts?**

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4693 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1153, as amended January 1995
- Bay Area AQMD Regulation 8 Rule 42, as adopted June 1994
- Sacramento Metro AQMD Rule 458, as amended September 1996
- Ventura County APCD does not have a specific prohibitory rule for this source category.

### **A. South Coast AQMD Rule 1153**

South Coast AQMD Rule 1153 (Commercial Bakery Ovens) only applies to units with a burner rating greater than 2.0 MMBtu/hr and VOC emissions greater than 50 lb-VOC/day. This rule also requires the facility to reduce the amount of VOC emission emitted by: 70% by weight if the oven has a daily average of 50 lbs -100 lbs of VOC emitted, 95% by weight if the oven has a daily average greater than 100 lbs of VOC emitted, and 95% by weight for new ovens that have a daily average greater than 50 lbs of VOC emitted.

District Rule 4693 is applicable to all bakery ovens at major sources. Based on South Coast AQMD Rule 1153, bakeries with VOC emissions less than 50 lb/day (18,250 lb/year) are exempt from the requirements of the rule. Since facilities in the SJVAPCD with emissions of 18,250 lb-VOC/year are not considered major sources; the applicability of District Rule 4693 is not as stringent as South Coast AQMD Rule 1153. South Coast AQMD Rule 1153 also states that bakeries with VOC emissions between 50 lb/day (18,250 lb/year) and 100 lb/day (36,500 lb/year) must reduce their emissions by 70% by weight.

However, upon EPA approval of the Districts revised NSR rule (which is expected to be adopted by the District's Board in December 2008), the Major Source threshold for VOC emissions will be lowered to 20,000 lb-VOC/year. The lowering of the Major Source threshold will make the requirements of District Rule 4693 applicable to previously exempt bakeries. The applicable bakeries will be required to collect emissions from the bakery ovens vent them to a control device with at least a 95% control efficiency. In comparison, South Coast AQMD Rule 1153, states that bakeries with VOC emissions between 50 lb/day (18,250 lb/year) and 100 lb/day (36,500 lb/year) must reduce their emissions by 70% by weight. Therefore, District Rule 4693 will have more stringent VOC emission control requirements that are than South Coast Rule 1153.

### **B. Bay Area AQMD Regulation 8 Rule 42**

Bay Area AQMD Regulation 8 Rule 42 (Large Commercial Bread Bakeries) applies to bread bakeries with an average daily production of greater than 100,000 lb/bread.

Bakeries with daily VOC emissions less than 150 lb/day (54,750 lb/year) are considered low emitting ovens and are exempt from the emission control requirements of this rule. New and modified bakery ovens that meet the applicability of this rule are required to vent all emissions to a control system capable of reducing emissions by 90%.

District Rule 4693 is applicable to all bakery ovens at major sources. Based on BAAQMD Regulation 8 Rule 42, bakeries with VOC emissions less than 150 lb/day (54,750 lb/year) are exempt from the requirements of the rule. Since facilities in the SJVAPCD with emissions of 54,750 lb-VOC/year are considered major sources, the applicability requirements of District Rule 4693 are more stringent than those of BAAQMD Regulation 8 Rule 42. District Rule 4693 also states that collected emissions from all bakery ovens are required to be vented to a control device with at least a 95% control efficiency. District Rule 4354 has VOC emission control requirements that are more stringent than BAAQMD Regulation 8 Rule 42.

### **C. Sacramento Metro AQMD Rule 458**

Sacramento Metro AQMD Rule 458 (Large Commercial Bread Bakeries) applies to bread bakeries which produce equal to or more than 100 lb-VOC/day. All bakery ovens that meet the applicability of this rule are required to vent all emissions to a control device with a control efficiency of 95% on a mass basis.

District Rule 4693 is applicable to all bakery ovens at major sources. Based on Sacramento Metro AQMD Rule 458, bakeries with VOC emissions less than 36,500 lb/year are exempt from the requirements of the rule. Since facilities in the SJVAPCD with emissions of 36,500 lb-VOC/year are not considered major sources; the applicability of District Rule 4693 is not as stringent as Sacramento Metro AQMD Rule 458. However, upon EPA approval of the District's revised NSR rule (which is expected to be adopted by the District's Board in December 2008), the Major Source threshold for VOC emissions will be lowered to 20,000 lb-VOC/year. This lowering of the Major Source threshold will result in the applicability of the District Rule 4693 more stringent than Sacramento Metro AQMD Rule 458. District Rule 4693 also states that collected emissions from all bakery ovens are required to be vented to a control device with at least a 95% control efficiency. Therefore, District Rule 4354 and Sacramento Metro AQMD Rule 458 have at least equivalent if not more stringent (when the District's major source threshold is lowered) VOC emission control requirements.

### **Conclusion**

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4693 satisfies RACT for bakery ovens.

## Rule 4694 – Wine Fermentation and Storage Tanks

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
VOC	3.6	3.7	3.8	3.8	3.9	4.0	4.1	4.1

(Source: District 2007 Ozone Plan)

### District Rule 4694 Description

The purpose of this rule is to reduce emissions of volatile organic compounds (VOC) from the fermentation and bulk storage of wine, or achieve equivalent reductions from alternative emission sources.

The rule requires facilities to reduce the VOC emissions from fermentation by 35% of their baseline emissions annually. Tanks over 5,000 gallons in volume must be equipped with pressure/vacuum relief valves operating within 10% of the maximum allowable working pressure of the tank, and the temperature of stored wine must be maintained at or below 75 degrees Fahrenheit.

The rule exempts storage tanks constructed primarily of concrete or wood and wineries that emit less than 10 tons of VOC per year.

### How does District Rule 4694 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this source category.

## Rule 4702 – Internal Combustion Engines – Phase 2

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NO <sub>x</sub>	31.80	31.58	29.77	29.12	27.72	25.52	23.18	20.69
VOC	5.29	5.25	5.19	5.17	5.15	5.15	5.17	5.21

(Source: District 2007 Ozone Plan)

### District Rule 4702 Description

Rule 4702, recently amended on January 18, 2007, limits NO<sub>x</sub>, CO, and VOC emissions from internal combustion engines. The main rule requirement is the limitation of NO<sub>x</sub>, CO, and VOC emissions. These limitations are shown in the tables below.

Rule 4702 Emission Limits – Spark Ignited Engines			
Engine Type	NO <sub>x</sub> Emission Limit (ppmv @ 15% O <sub>2</sub> , dry)	CO Emission Limit (ppmv @ 15% O <sub>2</sub> , dry)	VOC Emission Limit (ppmv @ 15% O <sub>2</sub> , dry)
1. a. Rich Burn, Waste Gas Fueled	50 or 90% reduction	2,000	250
1. b. Rich Burn, Cyclic Loaded, Field Gas Fueled	50	2,000	250
1. c. Rich Burn, All Other Engine	25 or 96% reduction	2,000	250
2. a. Lean Burn 2-Stroke, Gaseous Fueled, < 100 hp	75 or 85% reduction	2,000	750
2. b. Lean Burn, All Other Engines	65 or 90% reduction	2,000	750
3. a. Rich-Burn Engines Used Exclusively in Ag Operations, Comply by 1/1/2009 or if the owner has an agreement to electrify comply by 1/1/2010	90 ppmv or 80% reduction	2000 ppmv	250 ppmv
4. a. Lean-Burn Engines Used Exclusively in Ag Operations, Comply by 1/1/2009 or if the owner has an agreement to electrify comply by 1/1/2010	150 ppmv or 70% reduction	2000 ppmv	750 ppmv
5. a. Certified Spark-Ignited Engine Used Exclusively in AO and installed on or before June 16, 2005, Comply by 6/1/2006	Meet Certified Spark-Ignited Engine Standard of HC + NO <sub>x</sub> < 0.6 g/bhp-hr		

<b>Rule 4702 Emission Limits – Compression Ignited Engines</b>		
<b>Engine Type</b>	<b>Emission Limit / Standard</b>	<b>Compliance Date</b>
1. a. Non-Certified Compression-Ignited Engine, Greater than 50 bhp but not more than 500	EPA Tier 3 or Tier 4	1/1/2010
1. b. Non-Certified Compression-Ignited Engine, Greater than 500 bhp but not more than 750 bhp and less than 1000 annual operating hours	EPA Tier 3	1/1/2010
1. c. Non-Certified Compression-Ignited Engine, Greater than 750 bhp and less than 1000 annual operating hours	EPA Tier 4	7/1/2011
1. d. Non-Certified Compression-Ignited Engine, Greater than 500 bhp and greater than or equal to 1000 annual operating hours	80 ppm NO <sub>x</sub> , 2,000 ppm CO, 750 ppm VOC	1/1/2008 or, if owner has an agreement to electrify, comply by 1/1/2010
2. a. Certified Compression-Ignited Engine, EPA Certified Tier 1 or Tier 2 Engine	EPA Tier 4	1/1/2015 or 12 years after installation date, whichever is later
2. b. Certified Compression-Ignited Engine, EPA Certified Tier 3 or Tier 4 Engine	Meet Certified Compression-Ignited Engine Standard in effect at time of installation	At time of installation

On January 10, 2008 EPA took direct final action to approve revisions to the San Joaquin Valley Unified Air Pollution Control District portion of the California State Implementation Plan. These revisions included approval of District Rule 4702. EPA, in evaluating and approving Rule 4702 included the following:

“We believe these rules are consistent with the relevant policy and guidance regarding enforceability, RACT, BACM, and SIP relaxations.” (*CFR Volume 72, Number 103*)

Since Rule 4702 was recently approved by EPA as meeting RACT requirements, the District did not pursue a detailed RACT analysis.

### **How does District Rule 4702 compare with federal rules and regulations?**

The District did not conduct a detailed analysis of federal rules and regulations for Rule 4702.

**How does District Rule 4702 compare to rules in other air districts?**

The District did not conduct a detailed comparison to rules in other air districts for Rule 4702.

**Conclusion**

District staff concludes that District Rule 4702 satisfies RACT for internal combustion engines.



## Rule 4703 – Stationary Gas Turbines

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NO <sub>x</sub>	8.4	4.8	5.0	5.1	5.2	5.3	5.6	5.7
VOC	0.64	0.67	0.68	0.68	0.68	0.71	0.74	0.76

### I. District Rule Description:

Rule 4703, recently amended on September 20, 2007, limits NO<sub>x</sub> and VOC emissions from stationary gas turbines with a ratings equal to or greater than of 0.3 MW or a maximum heat input of more than 3.0 MMBtu/hr. The main rule requirement is the limitation of NO<sub>x</sub> emissions. Laboratory units used in research and testing for the advancement of gas turbine technology, units limited by permit condition to be operated exclusively for firefighting and/or flood control, and emergency standby units limited by permit condition to operate less than 100 hours per calendar year for maintenance and testing purposes are not subject to the emission requirements of this rule. These limitations are shown in the tables below.

Rule 4703 Emission Limits – Tier 2			
Turbine Classification Rating	Compliance Option	NO <sub>x</sub> Compliance Limit (ppmv @ 15% O <sub>2</sub> )	
		Gas Fuel	Liquid Fuel
a) Less than 2.0 MW Solar Saturn, driving a centrifugal compressor	Standard	50	50
b) No greater than 10 MW, if a DLN System is commercially available for the specific unit, as of April 30, 2003.	Standard	25	65
c) No greater than 10 MW, if a DLN System is not commercially available for the specific unit, as of April 30, 2003.	Standard	35	65
d) Greater than 10 MW, Combined cycle.	Standard	5	25
	Enhanced	3	25
e) Greater than 10 MW, Simple cycle, and permit condition for greater than 877 hrs/yr operation.	Standard	5	25
	Enhanced	3	25
f) Greater than 10 MW, Simple cycle, and permit condition for no greater than 877 hrs/yr operation.	Standard	25	42
	Enhanced	5	25

Rule 4703 Emission Limits – Tier 3		
Turbine Classification Rating	NO <sub>x</sub> Compliance Limit (ppmv @ 15% O <sub>2</sub> )	
	Gas Fuel	Liquid Fuel
a) Less than 3 MW.	9	25
b) 3 MW to 10 MW pipeline gas turbine.	8 during steady state and 12 during non-steady state	25
c) 3 MW to 10 MW and permit condition for less than 877 hrs/yr operation and not listed above.	9	25
d) 3 MW to 10 MW and permit condition for 877 hrs/yr operation or greater and not listed above.	5	25
e) Greater than 10 MW, Simple cycle, and permit condition for greater than 200 hrs/yr operation, except as provided in Section 5.1.3.3.	25	42
f) Greater than 10 MW, Simple cycle, and permit condition for greater than 200 hrs/yr operation but no greater than 877 hrs/yr operation.	5	25

## II. How does District Rule 4703 compare to rules in other air districts?

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4703 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1134, as amended August 1997
- Bay Area AQMD Regulation 9 Rule 9, as amended December 2006
- Sacramento Metro AQMD Rule 413, as amended March 2005
- Ventura County APCD Rule 74.23, as amended January 2002

### 1. South Coast AQMD Rule 1134

South Coast AQMD Rule 1134 (Emission of Oxides of Nitrogen From Stationary Gas Turbines) applies to all existing stationary gas turbine, 0.3 megawatt MW and larger. The NO<sub>x</sub> emissions limits for different rated turbines are shown in the table below.

<b>SCAQMD Rule 1134 Emission Limits</b>		
<b>Type of Unit</b>	<b>NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>	<b>District Rule 4703 NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>
0.3 to Less Than 2.9 MW	25	9
2.9 to Less Than 10.0 MW	9	8 during steady state 12 during non-steady state
2.9 to Less Than 10.0 MW No SCR	15	9
10.0 MW and Over	9	25
10.0 MW and Over No SCR	12	25
60 MW and Over Combined Cycle No SCR	9	5
60 MW and Over Combined Cycle	9	5
2.9 to Less Than 10.0 MW Utilizing Fuel Containing a Minimum of 60% Sewage Digester Gas by Volume on a Daily Average	25	5

As shown in the table above, the NO<sub>x</sub> emission limits for District Rule 4703 are equivalent to the NO<sub>x</sub> emission requirements for SCAQMD Rule 1134 for most types of units. There are more stringent NO<sub>x</sub> emission limits in District Rule 4703 for the types of units that are not as stringent as SCAQMD Rule 1134, however the units they apply to have a more descriptive description than the SCAQMD Rule. Therefore, if there were two NO<sub>x</sub> emission limits in District Rule 4703 that could apply to the type of units described in SCAQMD Rule 1134, the higher of the two limits was chosen. District Rule 4703 has comparable NO<sub>x</sub> emission limits when compared to SCAQMD Rule 1134. Therefore the emission limitations of District Rule 4703 are comparable to those of SCAQMD Rule 1134.

Since the emission limits of District Rule 4703 are comparable to SCAQMD Rule 1134, District Rule 4703 meets RACT for stationary gas turbines.

## 2. Bay Area AQMD Regulation 9 Rule 9

Bay Area AQMD Regulation 9 Rule 9 (Nitrogen Oxides from Stationary Gas Turbines) applies to stationary gas turbines with a heat input greater than 5 MMBtu/hr. Turbines used solely for the testing of aircraft engines for flight certification and turbines used solely for the firefighting and/or flood control are not subject to the requirements of this rule.

<b>BAAQMD Reg 9 Rule 9 Emission Limits (Effective January 1, 2010)</b>			
<b>Type of Unit</b>	<b>NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>		
	<b>Natural Gas</b>	<b>Refinery Fuel Gas, Waste Gas or LPG</b>	<b>District Rule 4703 NO<sub>x</sub> Limit</b>
5 to 50 MMBtu/hr (< 3 MW)	42	50	9
>50 to 150 MMBtu/hr (No retrofit available) (3 to 10 MW)	42	50	8 during steady state 12 during non-steady state
>50 to 150 MMBtu/hr (WI/SI enhancement available) (3 to 10 MW)	35	50	8 during steady state 12 during non-steady state
>50 to 150 MMBtu/hr (DLN technology available) (10 to 19 MW)	25	50	5
>150 to 250 MMBtu/hr (10 to 19 MW)	15	15	5
>250 to 500 MMBtu/hr (19 to 40 MW)	9	9	5
>500 MMBtu/hr (40+ MW)	5	9	5

Until January 1, 2010, a person may operate a stationary gas turbine for up to **877 hours** in any 12-month period (not counting hours of emergency use) without complying with the emission limits Section 9-9-301 as long as nitrogen oxides (NO<sub>x</sub>) emission concentrations, do not exceed **42 ppmv @ 15% O<sub>2</sub>** when firing with natural gas.

After January 1, 2010, a person may operate a stationary gas turbine rated at 50 MMBtu/hr or greater for up to **877 hours** in any 12-month period (not counting hours of emergency use) without complying with the emission limits set forth in Section 9-9-301 as long as nitrogen oxides (NO<sub>x</sub>) emissions are less than either of the of the alternative limits listed below for the turbine's heat input rating and the type of fuel burned.

<b>BAAQMD Reg 9 Rule 9 Emission Limits</b>			
<b>Type of Unit</b>	<b>NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>		
	<b>Natural Gas</b>	<b>Refinery Fuel Gas, Waste Gas or LPG</b>	<b>District Rule 4703 NO<sub>x</sub> Limit</b>
>50 to 150 MMBtu/hr (3 to 10 MW)	42	N/A	9
>150 to 250 MMBtu/hr (10 to 19 MW)	42	N/A	5
>250 to 500 MMBtu/hr (19 to 40 MW)	25	N/A	5
>500 MMBtu/hr (40+ MW)	25	N/A	5

As shown in the tables above, District Rule 4703 has lower emission limits for NO<sub>x</sub> than BAAQMD Reg 9 Rule 9 for all types of units. Therefore the emission limitations of District Rule 4703 are as stringent as BAAQMD Reg 9 Rule 9.

Since the emission limits of District Rule 4703 are as stringent as BAAQMD Reg 9 Rule 9, District Rule 4703 meets RACT for stationary gas turbines.

### 3. Sacramento Metro AQMD Rule 413

Sacramento Metro AQMD Rule 413 (Stationary Gas Turbines) applies to all stationary gas turbines with ratings equal to or greater than 0.3 megawatt (MW) output, or 3 MMBTU/hr input and operated on gaseous and/or liquid fuel. The emission requirements of this rule shall not apply to the operation of gas turbines used to provide emergency electrical power, emergency water pumping for flood control or fire fighting, emergency potable water pumping, or emergency sewage pumping. Only the gaseous fuel fired limits from this rule will be compared to District Rule 4703.

<b>Sacramento Metro AQMD Rule 413 Emission Limits</b>			
<b>Time of Operation</b>	<b>Type of Unit</b>	<b>NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>	<b>District Rule 4703 NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>
Any (RACT)	≥ 0.3 MW	42.0	Exempt
Any (BARCT)	≥ 0.3 to 2.9 MW	42.0	9
< 877 (BARCT)	≥ 2.9 MW	42.0	9
≥ 877 (BARCT)	≥ 2.9 to <10 MW	25.0	5
≥ 877 (BARCT)	≥ 10.0 (no SCR)	15.0	5
≥ 877 (BARCT)	≥ 10.0 (w/ SCR)	9.0	5

As shown in the tables above, District Rule 4703 has lower emission limits for NO<sub>x</sub> than Sacramento Metro Rule 413 for all types of units. Therefore the emission limitations of District Rule 4703 are as stringent as Sacramento Metro Rule 413.

Since the emission limits of District Rule 4703 are as stringent as Sacramento Metro Rule 413, District Rule 4703 meets RACT for stationary gas turbines.

### 4. Ventura County APCD Rule 74.23

Ventura County APCD Rule 74.23 (Stationary Gas Turbines) applies to stationary gas turbines rated at 0.3 MW or greater operated on gaseous or liquid fuel. Turbines used for research and testing for the advancement of gas turbine technology, for fire fighting or floor control, less than 200 hour per year, and turbines used as emergency standby engines limited to maintenance operation less than 104 hours per year are not subject to the emission requirements of this rule. Only the gaseous fuel fired limits from this rule will be compared to District Rule 4703.

<b>VCAPCD Rule 74.23 Emission Limits</b>		
<b>Type of Unit</b>	<b>NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>	<b>District Rule 4703 NO<sub>x</sub> Limit ppmv @ 15% O<sub>2</sub></b>
0.3 to < 2.9 MW	42	9
2.9 to < 10.0 MW	25 x E/25	8 during steady state 12 during non-steady state
10.0 MW and up, w/ SCR	9 x E/25	5
10.0 MW and up, w/o SCR	15 x E/25	5
4.0 MW and up, less than 877 hours per calendar year	42	9

$$E = (\text{MRE [Continuous] at LHV}) (\text{LHV}) \div (\text{HHV})$$

Where LHV = the lower heating value of the fuel  
 HHV = the higher heating value of the fuel  
 MRE = manufacturer's rated thermal efficiency

According to AP-42, 3.1-1 (4/00), the typical efficiency for a stationary gas turbine is 38% to 60%. Assuming the highest efficiency of 60%, the NO<sub>x</sub> emission limits from District Rule 4703 are still lower than that of VCAPCD Rule 74.23 for all types of units. Therefore the emission limitations of District Rule 4703 are as stringent as VCAPCD Rule 74.23.

Since the emission limits of District Rule 4703 are as stringent as VCAPCD Rule 74.23, District Rule 4703 meets RACT for stationary gas turbines.

### III. Conclusion

After careful evaluation of prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4703 satisfies RACT for stationary gas turbines.

## Rule 4902 – Residential Water Heaters

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	1.37	1.27	1.30	1.31	1.33	1.36	1.39	1.42
VOC	0.10	0.11	0.11	0.11	0.111	0.11	0.12	0.12

(Source: District 2007 Ozone Plan)

### District Rule 4902 Description:

Units in this source category are water heaters located in private residences with heat input of 75,000 British thermal units per hour (Btu/hr) or less. The following units are exempt: water heaters using fuels other than natural gas, natural gas-fired heaters used exclusively to heat swimming pools or hot tubs, and water heaters used exclusively in recreational vehicles.

### How does District Rule 4902 compare with federal rules and regulations?

#### **A. EPA – Control Technique Guidelines (CTG)**

There is no CTG for this source category.

#### **B. EPA – Alternative Control Technology (ACT)**

There is no ACT for this source category.

#### **C. Standards of Performance for New Stationary Sources (NSPS)**

There is no NSPS for this source category.

#### **D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)**

There is no NESHAP or MACT for this source category.

### How does District Rule 4902 compare to rules in other air districts?

District staff compared NOx limits and optional control requirements in District Rule 4902 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1121, as amended September 2004
- Bay Area AQMD Regulation 9 Rule 6, as amended November 2007
- Sacramento Metropolitan AQMD Rule 414, as adopted August 1996
- Ventura County APCD Rule 74.11, as amended December 1986

#### **A. South Coast AQMD Rule 1121**

South Coast AQMD Rule 1121 (Control of NO<sub>x</sub> from Residential Type Natural Gas-Fired Water Heaters) applies to manufacturers, distributors, retailers, and installers of natural gas-fired water heaters, with heat input rates less than 75,000 Btu per hour. Water heaters in recreational vehicles are exempt from control requirements. For water heaters not in mobile homes, there are two NO<sub>x</sub> limits for residential water heaters that are considered equivalent – one based on heat input to the unit and the other based on heat output from the unit. The emission limits are no more than 10 nanograms of NO<sub>x</sub> per joule of heat output (23 pounds per billion Btu (lb/billion Btu) of heat output) or 15 parts per million by volume at 3% oxygen, dry (17.5 lb/billion Btu of heat input). Water heaters in mobile homes have a different NO<sub>x</sub> limit - no more than 40 nanograms of NO<sub>x</sub> per joule of heat output (93 lb/billion Btu of heat output) or 55 parts per million by volume (ppmv) at 3% oxygen, dry (71 lb/billion Btu of heat input).

These limits were phased in over three years beginning in 2006; meaning that the limits have not been fully implemented until this year. From this perspective, the lower limits in South Coast AQMD Rule 1121 represent RACT for future rule-making and not for current analysis of District Rule 4902. District Rule 4902 is undergoing rule development as part of the District's 8-hour ozone attainment strategy. District staff anticipates incorporating the South Coast AQMD limits for this source category. Adoption of the rule amendments is expected in the first quarter of 2009.

#### **B. Bay Area AQMD Regulation 9 Rule 6**

Bay Area Regulation 9 Rule 6 (Nitrogen Oxides Emissions from Boilers and Water Heaters) is an umbrella rule that covers boilers and water heaters up to two million Btu per hour. The rule applies to all units regardless of whether the units are residential, commercial, industrial, or institutional use. Units with heat input of not more than 75,000 Btu per hour are generally considered residential units, so the portion of the rule that applies to units of this size will be used for the analysis. This rule was amended recently. The current requirements for residential-type units is certified units with emissions of not more than 40 nanograms NO<sub>x</sub> (calculated as NO<sub>2</sub>) per joule of heat input. Beginning in 2009 and phasing in over the next three years, the NO<sub>x</sub> limit will be 10 nanograms NO<sub>x</sub> per joule of heat input. The new units would need to be certified to this lower limit. The 10 nanograms per joule limit mirrors the South Coast rule for this source category, however to date, the rule has not been fully implemented. From this perspective, the lower limits in the Bay Area AQMD rule represent RACT for future rule-making and not for current analysis of District Rule 4902. District Rule 4902 is undergoing rule development as part of the District's 8-hour ozone attainment strategy.



District staff anticipates incorporating the lower limits for this source category. Adoption of the rule amendments is expected in the first quarter of 2009.

**C. Sacramento Metropolitan AQMD Rule 414**

Sacramento Metropolitan AQMD Rule 414 (Natural Gas-Fired Water Heaters) applies to any person who manufactures, distributes, offers for sale, sells, or installs any natural gas-fired water heater with a rated heat input capacity less than 75,000 Btu/hr. Exempted units include water heaters in recreational vehicles, water heaters in swimming pools and hot tubs and water heaters that use fuel other than natural gas. The rule requires that certified units be used. For water heaters used in mobile homes, the rule limits NOx emissions to 50 nanograms of NOx per joule of heat output (116 lb/billion Btu of heat output). All other subject units are limited to NOx emission of no more than 40 nanograms NOx per joule of heat output (93 lb/billion Btu of heat output). Both NOx limits are calculated as NO2. The NOx limits in current District Rule 4902 are at least as stringent as the Sacramento Metropolitan AQMD Rule 414.

**D. Ventura County APCD Rule 74.11**

Ventura County APCD Rule 74.11 (Natural Gas-fired Residential Water Heaters – Control of NOx) applies to any person selling, offering for sale, or installing natural gas-fired residential water heaters in Ventura County. The units subject to the rule have a rated heat input of less than 75,000 Btu/hour. Water heaters used in recreational vehicles and water heaters installed in mobile homes are exempt. The rule requires a certified unit that emits no more than 40 nanograms of NOx (calculated as NO2) per joule of heat output (93 pounds NOx per billion Btu of heat output). The NOx limits in current District Rule 4902 match the requirements of the Ventura County APCD rule.

**Conclusion**

There are no federal rules for regulations covering air emissions for this source category. After careful evaluation of prohibitory rules in other California nonattainment areas, District staff concludes that current District Rule 4902 satisfies RACT for residential water heaters.

## Rule 4905 – Natural Gas-Fired, Fan-Type Residential Central Furnaces

### Emissions Inventory:

Tons per day – summer season

Pollutant	2005	2008	2011	2012	2014	2017	2020	2023
NOx	4.21	4.12	4.03	4.00	3.93	3.81	3.67	3.5
VOC	0.21	0.20	0.20	0.20	0.19	0.19	0.18	0.17

(Source: District 2007 Ozone Plan)

### District Rule 4905 Description

Rule 4905, recently adopted on October 20, 2005, limits NOx emissions from residential central furnaces. The main rule requirement is written, as follows: No person shall supply, sell, offer for sale, install, or solicit the installation of any natural gas-fired fan-type residential central furnace for use within the District unless it has certified emissions of oxides of nitrogen less than or equal to 0.093 pounds of oxides of nitrogen per million BTU heat output or 55 ppm NOx at 3.00% O<sub>2</sub> stack gas by volume (dry).

Since Rule 4905 was recently approved by EPA, and the source category does not include any major sources, the District did not pursue a detailed RACT analysis.

### How does District Rule 4905 compare with federal rules and regulations?

The District did not conduct a detailed analysis of federal rules and regulations for Rule 4905.

### How does District Rule 4905 compare to rules in other air districts?

The District did not conduct a detailed comparison to rules in other air districts for Rule 4905.

### Conclusion

District staff concludes that District Rule 4905 is exempt from RACT requirements because the Natural Gas-Fired, Fan-type, Residential Central Furnaces source category contains no major sources.

## 4.2 RULES ON A SCHEDULE TO IMPLEMENT RACT/CTG REQUIREMENTS

After a careful and wide-ranging examination of individual rules against multiple federal rules, regulations, and technology guidelines as well as evaluating District rules against comparable rules from California's most technologically progressive air districts, staff has identified a few rules which will require amendments to fully implement RACT or CTG requirements.

### 4.2.1 Rules Implementing RACT Requirements

Out of the 55 rules evaluated in this report, only two rules (Rule 4311 - Flares and Rule 4684 - Polyester Resin Operations) have been identified as potentially needing revision to fully address RACT requirements. As outlined in Table 4-3 below, Rule 4311 is currently undergoing a rule amendment and will be heard for adoption by the Governing Board in June 2009.

With respect to Rule 4684, as discussed in Chapter 1 of this report, RACT is inherently a "moving target" and technology/emission limits considered to meet RACT at the time of SIP-approval is generally rendered obsolete by more effective technology that is introduced at a later date. The last significant modification made to Rule 4684 was in late 2001<sup>15</sup>, whereas the other district rules which were used for comparison were modified in 2005 (SCAQMD and VCAPCD) and as recently as September 2008 (SMAQMD). It should be noted that the BAAQMD Rule which has not been modified since 1996, is less stringent than Rule 4684; further enforcing the concept of RACT as a moving target. Table 4-3 outlines the rule schedule for addressing the discrepancies between Rule 4684 and the other rules.

### 4.2.2 Rules Implementing CTG Requirements

In September 2008, EPA finalized and published four CTGs for air districts to implement, since according to Section 182(b)(2)(A), states must revise their SIPs to include RACT for each category of volatile organic compounds (VOC) sources covered by Control Techniques Guidelines (CTG) documents between November 15, 1990 and the date of attainment. EPA guidance requires that rules implement CTG requirements within one year of the date the CTGs are finalized. Two District rules (Rule 4603 and Rule 4653) need revisions to incorporate the new CTG requirements. Table 4-3 outlines the rule schedule for addressing the discrepancies between the rules and the CTGs.

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<sup>15</sup> Although Rule 4684 was modified in September 2007, the changes made only addressed the solvent cleaning portions of the rule and did not modify any other emission limits within the rule.

Rule #	Rule Title	Last Amended	Scheduled Adoption Date	Reason
4311	Flares	6/15/2006	June 2009	RACT
4603	Surface Coating of Metal Parts and Products	10/16/2008	September 2009	CTG
4653	Adhesives	9/20/2007	September 2009	CTG
4684	Polyester Resin Operations	9/20/2007	September 2009	CTG

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**Appendix A**

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**COMMENTS AND RESPONSES**

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## Appendix A: Comments and Responses

### A.1 EPA COMMENTS

1. **COMMENT:** SJ 4306 – Boilers, Steam Generators and Process Heaters, > 5 MMBtu/hr: The October 16, 2008 version of this rule, referred to in the RACT analysis, has not been submitted for SIP approval. The District should submit the rule.

**RESPONSE:** As mentioned above the rule was approved by the District's Governing Board on October 16, 2008 and was subsequently transmitted to ARB in December 2008. According to the ARB website, the rule package was forwarded to the EPA on March 17, 2009.

2. **COMMENT:** SJ 4307 – Boilers, Steam Generators and Process Heaters, 2 – 5 MMBtu/hr: The October 16, 2008 version of this rule, referred to in the RACT analysis, has not been submitted for SIP approval. The District should submit the rule.

**RESPONSE:** See response to Comment #1.

3. **COMMENT:** SJ 4311 – Flares: The conclusion on page 4-58 states that the District is amending the rule to incorporate flare minimization plans (FMPs) and expects to submit the amendments to its Board in the second quarter of 2009. Incorporation of an FMP requirement will help demonstrate implementation of RACT.

**RESPONSE:** Based on EPA comments, Chapter 4 of the report has been revised to include new Section 4.2 (Rules On A Schedule to Implement RACT/CTG Requirements) and Table 4-3 to identify the rules which need amendments to fulfill RACT or CTG requirements and their corresponding schedules. As described above Rule 4311 is on a schedule to fulfill RACT requirements.

4. **COMMENT:** SJ 4352 – Solid Fuel Boilers, Steam Generators and Process Heaters: Page 4-68 states that a 40 ppm NO<sub>x</sub> emission limit is technologically infeasible for solid fuel fired units. The District should include or reference documentation to support this conclusion.

**RESPONSE:** The District has conducted source tests on all biomass units applicable to Rule 4352 and none have achieved 40ppm NO<sub>x</sub>. In addition, District staff is unaware of any biomass fired units that are capable of achieving 40ppm NO<sub>x</sub>. A feasibility study is currently underway for this source category,



and the District will consider amending Rule 4352 if lower NOx limits are determined to be technologically feasible.

5. **COMMENT:** SJ 4354 – Glass Melting Furnaces: On page 4-71, the District states that the limits in Rule 4354 are more stringent than all other analogous limits except flat glass in the BAAQMD rule, and that there are no flat glass furnaces in the BAAQMD. The District should document that there are no such units in the BAAQMD, at least with reference to communication with BAAQMD staff.

**RESPONSE:** Revisions to the report to reference communication with BAAQMD staff has been included as suggested.

6. **COMMENT:** SJ 4402, Crude Oil Production Sumps: EarthJustice has commented that this rule has more exemptions than other Districts and that SJVAPCD's 8-hour ozone attainment plan identified the inventory as 3-60 tons of VOC per day. SJVAPCD's current analysis estimates the inventory at 0.4 tpd VOC and explains why 1<sup>st</sup> stage tanks are not necessarily better than sumps. The analysis further explains that other exemptions are not cost effective or have negligible emission differences. We recommend the analysis also clarify how the original 3-60 tpd inventory was in error.

**RESPONSE:** Revisions to the report to clarify how the original inventory of 60 tpd was calculated and how the revised inventory of 3 tpd, has been included as suggested.

7. **COMMENT:** SJ 4570 – Confined Animal Facilities: In light of the nature of the industry, the limited regulatory history and the additional information expected in the near term, the District's draft RACT analysis may be appropriate for many CAF activities. However, additional analysis seems appropriate for those activities with relatively large emissions and potentially smaller variability, such as avian CAFs. Specifically, we recommend closer analysis of the avian CAF menus provided in the rule to see if specific menu options can be required because they are widely available, economically feasible and effective at reducing emissions.

**RESPONSE:** Based on EPA comments, Chapter 4 of the report has been revised to include language on Poultry operations. In addition, a poultry BACT analysis has also been attached which outlines the requirements of Rule 4570 being required as BACT. Since these measures have been considered to be BACT for poultry operations, Rule 4570 exceeds the RACT requirements

8. **COMMENT:** SJ 4602/4612 – Motor Vehicle and Mobile Equipment Coating Operations: We recommend the District include a brief discussion of CARB's Suggested Control Measure for auto-refinishing in the RACT analysis.

**RESPONSE:** Revisions to the report to address CARB's Suggested Control Measure (SCM) has been included as suggested.

9. **COMMENT:** SJ 4603 – Surface Coating of Metal Parts and Products: Page 4-174 notes several areas where the 2008 CTG is more stringent than Rule 4603 (e.g., VOC limits for baked extreme performance and repair and touch up coatings, and work practice standards for miscellaneous metal parts and products). Rules meeting the 2008 CTGs are required within one year of the date the CTGs are finalized (i.e., September 30, 2009).

**RESPONSE:** Revisions to the report further clarifying how Rule 4603 is, overall, as stringent as the CTG, has been included. In addition, as described in Table 4-3 of the report, Rule 4603 is on a schedule to fulfill CTG requirements.

10. **COMMENT:** SJ 4605 – Aerospace Assembly and Component Coating Operations: The analysis states that EPA approved Rule 4605 on May 30, 2007. However, we believe that EPA last approved Rule 4605 on December 20, 2001 and that more detailed RACT discussion is therefore appropriate.

**RESPONSE:** A more detailed RACT analysis for Rule 4605 has been included as suggested.

11. **COMMENT:** SJ 4606 - Wood Products: Rule 4606 exempts refinishing, replacement and custom replica furniture coating operations, while the CTG and rules from other Districts do not. More detailed discussion of this exemption in the RACT analysis seems appropriate.

**RESPONSE:** Revisions to the report further clarifying how the two permitted facilities which refinish are exempt from the requirements of the CTG, has been included as recommended. In addition, in a follow-up email from EPA, they further stated "Sorry about the confusion, but we now realize that the Wood Furniture Manufacturing Operations CTG does not apply to refinishing or replacement operations."

12. **COMMENT:** SJ 4641 - Cutback, Slow Cure and Emulsified Asphalt Paving and Maintenance Operations: Please explain why the exemption for medium cure asphalt for ambient temperature less than 50 degrees F is allowed.

**RESPONSE:** Revisions to the report to explain why the exemption for medium cure asphalt for ambient temperature less than 50 degrees F is allowed, has been included as suggested.

13. **COMMENT:** SJ 4651 - Soil Decontamination Operations: Please change "Municipal Waste Disposal Sites" to "Soil Decontamination Operations" in the conclusion.

**RESPONSE:** Revisions to the report has been included as suggested.

14. **COMMENT:** SJ 4653 – Adhesives: Page 4-294 states that the District will evaluate the September 2008 CTG for inclusion into District rules within one year. We note that submittal (not just evaluation) of rules (or negative declarations) meeting the 2008 CTGs are due by September 2009. We also note SJVAPCD's determination that Rule 4653 is less stringent than some other District adhesive limits and that more detailed evaluation of RACT during the next amendment to the rule is appropriate.

**RESPONSE:** As described in Table 4-3 of the report, Rule 4603 is on a schedule to fulfill CTG requirements and during the next rule amendment process will address discrepancies between Rule 4653 and other District's limits.

15. **COMMENT:** SJ 4682 – Polystyrene Foam, Polyethylene, and Polypropylene Manufacturing: Additional information would be useful justifying the 93% capture/control efficiency option and 30-day averaging.

**RESPONSE:** District Rule 4682 requires that the control device shall have a capture and control efficiency of 93%. This is greater than the previous emission control system requirements of 90% capture and 95% control (85.5% capture and control efficiency). The District Rule 4682 evaluation in Chapter 4 of the RACT Demonstration for Ozone SIP will be updated with this information.

Additional information for the monthly averaging period of emissions in District Rule 4682 can be found in the Final Staff Report for Revised Proposed Amendments to Rule 4682, dated September 20, 2007, and sent to EPA through ARB on March 7, 2008.

16. **COMMENT:** SJ 4684 – Polyester Resin Operations: Page 4-338 concludes that Rule 4684 does not satisfy RACT. We appreciate the District's analysis, and are available to review proposed changes to the rule.

**RESPONSE:** As discussed in Chapter 1, RACT is inherently a "moving target" and technology/emission limits considered to meet RACT at the time of SIP-approval is generally rendered obsolete by more effective technology that is introduced at a later date. The last significant modification made to Rule 4684 was in late 2001<sup>1</sup>, whereas the other district rules which were used for comparison were modified in 2005 (SCAQMD and VCAPCD) and as recently as September 2008 (SMAQMD). It should be noted that the BAAQMD Rule which has not been modified since 1996, is less stringent than Rule 4684; further enforcing the concept of RACT as a moving target. Although Rule 4684 limits are not as stringent as some of those contained within other district's rules, their limits may be considered beyond RACT, especially since their requirements are

<sup>1</sup> Although Rule 4684 was modified in September 2007, the changes made only addressed the solvent cleaning portions of the rule and did not modify any other emission limits within the rule.

more stringent than the CTG requirements. Since the CTG was recently adopted (2008), EPA would have conducted a thorough analysis for determining the reasonably available control to apply to the source category. Therefore, although RACT is inherently a “moving target”, a recently adopted CTG can be assumed as establishing RACT. Table 4-3 outlines the rule schedule for addressing the discrepancies between Rule 4684 versus the CTG and the other rules.

17. **COMMENT:** SJ 4694 – Wine Fermentation and Storage Tanks: The brief discussion starting on page 4-347 provides some support for the District’s finding that this rule implements RACT. We note that it does not address the extensive cost-effectiveness analysis previously performed by the District or the alternative compliance options identified as concerns by EPA on October 24, 2005, and in subsequent correspondence.

**RESPONSE:** Revisions to the report further clarifying how Rule 4694 is at a minimum RACT, if not goes beyond RACT, has been included.

18. **COMMENT:** SJ 4702 – IC Engines, Phase 2: The District states that they did not pursue a thorough RACT analysis because EPA approved the rule into the SIP on May 30, 2007. We believe the correct date is January 10, 2008.

**RESPONSE:** Revisions to the report has been included as suggested.

19. **COMMENT:** SJ 4703 – Stationary Gas Turbines: Page 4-353 states that a detailed RACT analysis is not needed because EPA approved the rule on May 30, 2007. We believe the last version approved was amended in 2002 approved by EPA in 2004, and the RACT analysis should be revised appropriately.

**RESPONSE:** Based on this comment from EPA, the District has performed an evaluation comparing the NOx emission limit requirements of District Rule 4703 to rules from select air districts within California nonattainment areas (South Coast AQMD, Bay Area AQMD, Sacramento Metro AQMD, and Ventura County APCD). Revisions to the District Rule 4703 RACT evaluation in Chapter 4 has been included as suggested..

## A.2 ARB COMMENTS

No comments were received.

## A.3 PUBLIC COMMENTS

No comments were received.

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## **Appendix B**

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### **Rule 4570 BACT Analysis**

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**Appendix B:**  
**Rule 4570 BACT Analysis**

**TOP-DOWN BACT ANALYSIS**

**POULTRY BROILER HOUSES**

**Facility Name:** Foster Farms, El Dorado Ranch

**Date:** September 19, 2005

**Mailing Address:** P.O. Box 831  
Attn: Environmental Affairs  
Livingston CA, 95334

**Reviewing Engineer:** Ramon Norman

**Lead Engineer:** Martin Keast

**Contact Person:** Dave Duke

**Telephone:** (209) 394-5343

**Application #:** C-5439-1-1

**Project #:** C-1051505

**Deemed Complete:** September 2, 2005

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**I. PROPOSAL:**

The primary business of Foster Farms, El Dorado Ranch is the production of broiler chickens to provide meat for human consumption. Foster Farms, El Dorado Ranch has requested Authority to Construct (ATC) permits for the addition of 12 new mechanically ventilated broiler houses for 397,440 birds (33,120 birds/house) and one diesel-fired emergency IC engine at 1324 South El Dorado Ave. in Tranquility, CA.

Foster Farms, El Dorado Ranch is an agricultural operation that raises fowl for human consumption. Pursuant to Senate Bill (SB) 700, all agriculture operations, including Confined Animal Facilities (CAF), with emissions greater than ½ the major source emissions threshold levels (12.5 ton/year of NO<sub>x</sub> or VOC), are required to obtain a District permit. The existing 1,280,000 bird broiler operation has emissions exceeding the 12.5 ton-VOC/year threshold and is classified as a large CAF by the California Air Resources Board (ARB). The facility received a District permit for the existing operation on April 28, 2005.

Since the broiler operation is subject to permitting requirements and the addition of the new mechanically ventilated broiler houses will result in VOC and NH<sub>3</sub> emissions exceeding the Best Available Control Technology (BACT) threshold of 2.0 lb/day for each house, BACT is required for VOC and NH<sub>3</sub> emissions from the new houses.

**II. PROCESS DESCRIPTION:**

Broilers are produced to meet specific requirements of the customer, which can be a retail grocery store, fast-food chain, or an institutional buyer. The process of raising broiler



chickens in the proposed houses is similar to the practices at modern broiler ranches. The production cycle of broilers is divided into two phases: brooding and grow-out. The brooding phase begins when freshly hatched chicks from local hatcheries are delivered by truck and placed in a heated section of a broiler house known as the brood chamber. The brood chamber of the house is maintained above 90 °F for newly hatched chicks. At this site, about 33,120 chicks will be released into each house at the beginning of each grow-out period. The chicks will be placed on fresh litter in the front half of the house opposite the tunnel-ventilation fans for 10 days. During the birds' first few weeks of growth, the temperature is gradually decreased. Once the birds need floor space, the remaining half of the house is opened and the chicks are fed out to market weight. After completion of the grow-out phase the broilers are transported by truck to a nearby processing plant. Typically, all of the houses within a ranch complex will be populated with chicks, and depopulated with mature birds within the same few days.

All broiler chickens in the house are the same age and will be removed from the house at the same time. Typically, about 4.5 to 5 percent of the broilers in a house will die (mortality) during the grow-out cycle. Mortality must be removed from each house at least daily during the grow-out cycle to prevent the spread of disease. The length of the grow-out phase for the broiler chickens is approximately 45 days, resulting in an average weight of 4.5 to 5.5 pounds. Broiler houses will be empty of chickens for approximately 10 days between flocks to allow for cleaning and maintenance. This results in a cycle time of about 55 days per flock. Typically, six flocks per year are grown in each broiler house.

## **Broiler Housing**

Broilers are raised in either totally or partially enclosed housing with a compacted soil floor covered with dry bedding. The broiler houses at this site will be constructed with earthen floors, wood framing, and corrugated metal roofing and siding. The ceiling and walls will be insulated. Each house will be 460 feet long and 54 feet wide. As stated above, about 33,120 chicks will be released into each house at the beginning of each grow-out period. The birds will be able to move about freely in the heated front section of the house. As the birds grow and require less heat, the other half of the house is opened to allow them to have more space. Water and feed will be provided to the birds throughout the grow-out period. Propane heaters and evaporative cooling pads are utilized to control temperature within the broiler houses.

In poultry houses, ventilation is used to remove moisture and ammonia from the houses during the winter season and to remove excess heat and ammonia from the houses during the summer season. Partially enclosed housing structures have open sidewalls with curtains that are opened and closed to control the house ventilation rate. At this site, all of the houses will be totally enclosed. In totally enclosed housing, mechanical ventilation is used. **Mechanical ventilation is typically provided by an induced draft or negative-pressure system. An induced draft system pulls fresh air into the house from one end and exhausts on the other. A negative-pressure system draws fresh air into the house from side vents and out through the exhaust fan.** Totally enclosed mechanically ventilated housing is known as tunnel-type housing or environmental housing.

The proposed houses will have an advanced environmental control system that uses thermostats, sensors, and timers to more effectively control their exhaust fans. Environmental conditions (e.g. temperature, humidity, ventilation, lighting) within the proposed houses will be controlled by a computer system. The ranch staff will also monitor the conditions within the houses at least twice daily.

### **Broiler Manure Management**

All broiler chickens are raised unconfined within the houses on dry bedding (litter). Litter can be sawdust, wood shavings, rice hulls, chopped straw, peanut hulls, or other products, depending on availability and cost. Foster Farms, El Dorado Ranch typically uses rice hulls for litter. Manure that is excreted by birds has a high water content. The main function of the litter is to absorb the moisture excreted by the birds.

A typical broiler house with a capacity for 22,000 birds at a time will produce 120 tons of litter per year (NCC, 1999). Since the proposed houses are 50% larger, containing 33,120 birds, each house would be expected to produce 180.7 tons of litter per year. Two kinds of manure are removed from broiler houses: litter and cake. Litter is a mixture of bedding and manure. Cake is a compacted and concentrated mixture of manure and litter that usually builds up on the surface of the litter around waterers and feeders, where much of the manure is deposited. Moisture from manure and waterers binds the mixture of litter and manure together forming cake. Broiler houses are partially cleaned between each flock to remove cake. The remaining litter may be “top dressed” with an inch or so of new bedding material.

Typically, the litter (bedding and manure) is only completely cleaned from broiler houses every one to three years after at least 6 flocks, with a trend towards performing complete clean-outs less than annually. Litter in the proposed houses will be completely cleaned out twice a year after only 3 flocks have been raised on the litter. At Foster Farms, El Dorado Ranch used litter is completely cleaned out of the brood chamber and moved to the other half of the house before chicks are placed. In the proposed houses, chicks will always be placed on fresh litter in the brood chamber. After complete clean-outs and brood chamber clean-outs, the removed litter is replaced with fresh litter. When the broiler house is completely cleaned out, the litter is typically removed with a front-end loader. When the house is cleaned, the equipment (including slats) is removed from the house to allow a front-end loader to push all of the manure to the center section of the house. Then the front-end loader places the mixture of manure and litter into a spreader for land application. A thorough cleaning after each flock removes pathogens that could be transferred to the next flock. After removal of all organic matter, the house is disinfected.

### **Broiler Manure Storage**

After complete cleanout of the litter after each flock, the litter is trucked off site. Traditionally, cake from broiler production facilities has been stored in uncovered stockpiles until conditions permitted land application. However, water quality concerns have led to the increased use of storage structures known as litter sheds for cake storage. Litter sheds typically are partially enclosed pole type structures. Water quality concerns also have led to the recommendation that cake not stored in litter sheds be placed in well-drained areas and

### **How does District Rule 4694 compare to rules in other air districts?**

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4694 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD (no rule for this source category)
- Bay Area AQMD (no rule for this source category)
- Ventura County APCD (no rule for this source category)
- Sacramento Metro AQMD (no rule for this source category)

### **Conclusion**

During the rule development process of adopting Rule 4694, staff performed extensive research to determine what types of controls that could be applied to this source category. The staff report for the rule states:

“The US EPA maintains a database on case-specific information on the "Best Available" air pollution technologies that have been required to reduce the emission of air pollutants from stationary sources (e.g., power plants, steel mills, chemical plants, etc.). The US EPA database contains no examples of controlling wine fermentation emissions. Additional literature searches produced no examples of fermentation emission control being implemented anywhere in the world. The District is the first district in the nation, perhaps the world, to propose controlling VOC emissions from wine fermentation tanks.”

In addition, District staff work with industry stakeholders to perform an extensive cost-effectiveness analysis for the proposed control technologies proposed for the rule.

Since there are no federal regulations or prohibitory rules in other California nonattainment areas, District staff concludes that District Rule 4694 at a minimum satisfies RACT, if not goes beyond RACT for Wine Fermentation and Storage Tanks.

be covered to prevent contaminated runoff and leaching. However, covering of stockpiles of cake is rare.

### **Emissions from Broiler Litter**

The principal pollutants emitted from broiler houses are Volatile Organic Compounds (VOC) and ammonia (NH<sub>3</sub>). A small amount of particulate matter (PM) is also emitted through the ventilation system. Factors that affect emissions from broiler houses include the moisture content of the litter; the pH; the ventilation rate; the temperature; and the amount of manure and length of the time the manure is present in the broiler house.

Manure as excreted by the birds has a high water content, most of which evaporates, emitting ammonia as the manure dries out. Ideally, litter in the broiler houses should contain no more than 20-25% moisture.<sup>1</sup> High moisture content in the litter will lead to the development of anaerobic conditions and the production of hydrogen sulfide and other reduced sulfur compounds. High moisture content in the litter will also lead to greater production of VOCs and methane and will facilitate the further conversion of organic nitrogen to ammonia. Additionally, the greater the moisture content the more favorable the environment for microbes responsible for emissions of ammonia and volatile organic compounds (VOC), which increases the likelihood that these compounds will be emitted. Moisture inside the broiler houses is controlled by adequate ventilation and regular maintenance of waterers to ensure that there are no leaks.

The ventilation rate affects the amount of ammonia, VOC, and particulate matter carried out of the broiler house. During the growth of the flock, continuous airflow removes ammonia and other gases and reduces the moisture of content freshly excreted manure. The constant volatilization and removal of ammonia from the broiler houses results in lower nitrogen content of the litter.

The potential to emit ammonia and VOCs increases with greater manure storage time and greater manure accumulation in the houses. The amount of manure and length of the time the manure is present in the broiler house is determined by the number of flocks that are raised on the litter before a complete cleanout. Fresh litter will have negligible emissions. Litter that has been reused for several flocks may have considerable emissions because of the accumulation of manure. As stated above, broiler houses are typically completely cleaned out after at least 6 flocks have been raised but the litter in the proposed houses will be completely cleaned after only 3 flocks have been raised.

### **VOC Emissions**

Volatile organic compounds are formed as intermediate metabolites in the degradation of organic matter in manure. Under aerobic conditions, any VOC formed are rapidly oxidized to carbon dioxide and water. Under anaerobic conditions, complex organic compounds are microbially decomposed to volatile organic acids and other volatile organic compounds,

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<sup>1</sup> Lesson 11: Using Dietary and Management Strategies to Reduce the Nutrient Excretion of Poultry; Paul Patterson

which in turn are mostly converted to methane and carbon dioxide by methanogenic bacteria. When the activity of the methanogenic bacteria is not inhibited, virtually all of the VOC are metabolized to simpler compounds, and the potential for VOC emissions is minimized. However, the inhibition of methane formation results in a buildup of VOCs in the litter and ultimately to volatilization to the air. VOC emissions will vary with temperature because the rate of VOC formation, reduction to methane, and volatilization varies with temperature.<sup>2</sup>

## **Control of VOC Emissions**

In comparison to the research on ammonia emissions from broiler houses, little research has been performed on the methods to reduce VOC emissions from broiler houses. Most of the research to this point has focused specifically on odor reduction. However, since VOC and ammonia emissions are the result of a similar microbial process, some of the methods that have been proven to reduce ammonia emissions are also expected to reduce VOC emissions. In addition to thermal incineration and carbon adsorption, other possible controls include biofiltration; diet manipulation; the use of acidifying litter amendments such as Alum (aluminum sulfate), Poultry Litter Treatment (PLT, sodium bisulfate), Poultry Guard (clay material containing sulfuric acid), phosphoric acid, etc.; litter management practices and broiler house construction; and the use of certain probiotics.

A biofilter is a device for removing contaminants from a gas in which the gas is passed through a media that supports the microbial activity by which the pollutant is degraded. One type of biofilter involves a porous medium (typically soil, compost or wood chips - green waste) that contains large populations of microbes. This type of biofilter system can be used to control the VOC emissions in the exhaust of the broiler house.

Nutritional management of broiler feed is routinely practiced to improve meat production and bird health. The potential for VOC emissions can be reduced by reducing the quantity of undigested nutrients in the litter. The majority of VOCs originate from the decomposition of undigested protein from which ammonia is also a byproduct.<sup>3</sup> The level of microbial action in the litter corresponds to the level of organic nitrogen content in the litter; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOC.

A diet that is formulated to feed proper amounts of protein will result in improved nitrogen utilization by the animal and corresponding reduction in uric acid, organic nitrogen content of litter, and VOC and ammonia production. Nitrogen excretion can be reduced by replacing crude protein in broiler diets with the specific amino acids required. It is possible to reduce crude protein levels by 3-4%, which will result in reductions of 13-22% in nitrogen without detriment to bird performance.<sup>4</sup> Enzymes and feed additives are also commonly used in conjunction with certain feeds to increase nutrient digestibility and nitrogen retention.<sup>4</sup> Studies on the digestibility of protein and amino acids in broiler chickens fed a corn and soybean diet

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<sup>2</sup> Emissions From Animal Feeding Operations – Draft, pg. 2-10

<sup>3</sup> PJ Hobbs et al

<sup>4</sup> Lesson 11: Using Dietary and Management Strategies to Reduce the Nutrient Excretion of Poultry; Paul Patterson

showed the supplementation of the enzyme phytase resulted in increased weight gain and digestibility of most amino acids.<sup>5</sup> The latest National Research Council (NRC) guidelines for the selection of an optimal poultry diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the bird and the minimum carryover of nitrogen into the litter.

Acidifying litter amendments such as Alum (aluminum sulfate), Poultry Litter Treatment (PLT, sodium bisulfate), Poultry Guard (clay material containing sulfuric acid), phosphoric acid, etc. are commonly used in poultry houses to reduce ammonia concentrations in the house during the critical first few weeks of bird development. Acidifying litter amendments are available in both granular and solution form, depending on the needs of the grower. Preliminary studies indicate that these amendments also result in lower VOC emissions. The reduction in VOC emissions is likely to be related to the inhibition of the growth of microbes responsible for decomposition of nutrients in the litter. It has been demonstrated that sufficient application of acidifying litter amendments to floor of a poultry house can reduce the total bacterial count by more than 99.99%.<sup>6</sup> The application of PLT to litter resulted in significant reductions of total bacterial count for 21 days as compared to control.<sup>7</sup> At an application rate of 100 lb per 1,000 ft<sup>2</sup> of broiler house floor space, granulated sulfuric acid and sodium bisulfate reduced bacterial pathogen levels. There have been several studies that show that acidifying litter amendments such as alum reduce the levels of bacterial pathogens, such as *Salmonella* and *Campylobacter* in the litter and on bird carcasses.<sup>8</sup> Since bacteria are responsible for VOC and ammonia production, this inhibition of microbial action translates into a reduction in VOC and ammonia emissions. More information about acidifying litter amendments is given under ammonia control options.

Broiler house construction and management practices are another method to reduce VOC emissions. The proposed houses are completely enclosed environmentally controlled houses in which the relative humidity is monitored to ensure that excessive moisture does not contact the litter. There is some research indicating that mechanically ventilated houses have less ammonia emissions than naturally ventilated houses.<sup>9</sup> Since there is correlation between VOC and ammonia emissions in poultry houses<sup>10</sup>, there may also be VOC reductions from mechanically ventilated houses in comparison to naturally ventilated houses. The computer controlled ventilation fans are more effective at reducing moisture inside the houses than natural (curtain) ventilation. The use of evaporative cooling pads as opposed to misting systems also reduces the chances that excessive moisture will contact the litter. House insulation and the use of mixing fans inside the house will help create greater uniformity in the temperature and relative humidity in the houses. This will minimize condensation inside the house caused when warmer air contacts cooler surfaces. Total cleanout of the houses twice per year will reduce the amount of organic material in the litter and the amount of time that this material is present, thereby decreasing the potential to emit VOCs and ammonia.

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<sup>5</sup> Sebastian et al.

<sup>6</sup> "Litter Amendments as a Tool for Optimizing Poultry House Clean Out", Avian Advice, Summer 2003, Vol.5, No. 2

<sup>7</sup> Dr. Richard Chin, California Veterinary Diagnostic Laboratory, Fresno - Final Bacteriological Results July 31, 1995

<sup>8</sup> Dr. Philip Moore, Jr., USDA/ARS, Fayetteville, Arkansas

<sup>9</sup> Ammonia Monitoring in Northern Ireland – comparison of ammonia concentrations downward of two types of broiler houses in Northern Ireland (March 2005), SNIFFER

<sup>10</sup> PJ Hobbs et al

Probiotics are microorganisms with beneficial characteristics. These microorganisms are usually the viable microbial cultures or their fermentation products. Most probiotics work through competitive exclusion, meaning that they cause a shift in the bacterial population from less desirable species to more desirable species. Probiotics have many of the advantages of antibiotics without the drawback of possibly creating antibiotic resistant pathogens. Bacterial enzymes in probiotics also promote the digestion of protein, lipids, and carbohydrates<sup>11</sup>, which will cause less of these nutrients to be excreted. Probiotics are used extensively in the poultry industry to promote animal health. The introduction of certain probiotics to poultry feed and litter has potential to reduce VOC and ammonia emissions. Recently, they have been used in Taiwan's animal farming industry to address concerns about the environmental impact of the animal farming. In one experiment, the introduction of Ecozyme®, a lactobacilli containing probiotic, to broiler feed reduced the pH and moisture content of the litter and resulted in greater than 90% reductions in malodorous VOC compounds.<sup>12</sup> The results of the study were confirmed by the Malaysian Animal Research Institute. The use of probiotics to control emissions is a developing area and more research is needed to quantify all potential reductions. Non-pathogenic bacteria can also be introduced into the litter in order to speed the oxidation of ammonia to nitrate and nitrite.<sup>13</sup>

## Ammonia Emissions

Ammonia in the presence of sulfur dioxide and nitrogen oxides is a precursor for the secondary formation of PM<sub>2.5</sub> in the atmosphere. Ammonia reacts with sulfuric and nitric acids, which are produced from sulfur dioxide and nitrogen oxides in the ambient air, to form ammonium sulfate, ammonium nitrate, and other fine particulates.<sup>14</sup> Exposure to high levels of ammonia can cause irritation to the skin, throat, lungs, and eyes.

Ammonia volatilization is the result of the microbial decomposition of nitrogenous compounds in poultry litter. The primary nitrogenous compound in poultry litter is uric acid, but nitrogenous compounds also occur in the form of undigested organic nitrogen in poultry feces. Whenever uric acid comes in contact with the enzyme urease, which is excreted in animal feces, the uric acid will hydrolyze rapidly to form ammonia and this ammonia will be emitted soon after. The formation of ammonia will continue more slowly (over a period of months or years) with the microbial breakdown of organic nitrogen in the litter. The rate of ammonia volatilization is influenced by a number of factors including the concentrations of nitrogenous compounds in the litter, temperature, air velocity, surface area, and moisture.

Several researchers have attempted to quantify ammonia emissions from broiler houses. However, there is great variability in the estimates to quantify ammonia emissions from broiler houses. Wheeler (2003) reported that overall ammonia emissions for birds from 1 to 23 days old housed in eleven broiler houses in Kentucky and Pennsylvania during the winter months varied from 0.2 – 0.92 g day<sup>-1</sup> bird<sup>-1</sup> on used litter and 0.0 – 0.92 g day<sup>-1</sup> bird<sup>-1</sup>

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<sup>11</sup> Larbier and Leclercq, 1994

<sup>12</sup> M. H. Chang and T. C. Chen, International Journal of Poultry Science 2 (5): 313-317, 2003

<sup>13</sup> "Litter Treatment", Martine Boulianne, University of Montreal

<sup>14</sup> Workshop Review Draft for EPA Regional Priority AFO Science Question Synthesis Document - Air Emission Characterization and Management, pg. 2

on fresh litter. Gates et al. (2004) reported that overall ammonia emissions from twelve broiler houses in Kentucky and Pennsylvania during the winter months varied from 0.0 – 1.5 g day<sup>-1</sup> bird<sup>-1</sup>. Lacey et al. (2003) reported ammonia emissions ranging from 0.05 – 1.90 g day<sup>-1</sup> bird<sup>-1</sup> for broilers raised in central Texas over a 49 day grow-out period. Groot Koerkamp et al. (1998) reported ammonia emissions ranging from 8.9 mg hr<sup>-1</sup> bird<sup>-1</sup> (0.21 g day<sup>-1</sup> bird<sup>-1</sup>; 0.17 lb year<sup>-1</sup> bird<sup>-1</sup>) to 19.8 mg hr<sup>-1</sup> bird<sup>-1</sup> (0.48 g day<sup>-1</sup> bird<sup>-1</sup>; 0.38 lb year<sup>-1</sup> bird<sup>-1</sup>). An average ammonia emission factor of 0.22 lb year<sup>-1</sup> bird<sup>-1</sup> (0.28 g day<sup>-1</sup> bird<sup>-1</sup>) was reported in the EPA Regional Priority AFO Science Question Synthesis Document - Air Emission Characterization and Management (Table 2-6, Poultry Emission Factors). A recent California Air Resources Board study at a Foster Farms broiler house resulted in an ammonia emission factor of 0.0958 lb year<sup>-1</sup> bird<sup>-1</sup> (approximately 0.121 g day<sup>-1</sup> bird<sup>-1</sup>). Variations in temperature, humidity, litter management, feed formulation, stocking density, and measurement methodology may all contribute to the wide variation in ammonia emission estimates from broiler houses.

### **Control of Ammonia Emissions**

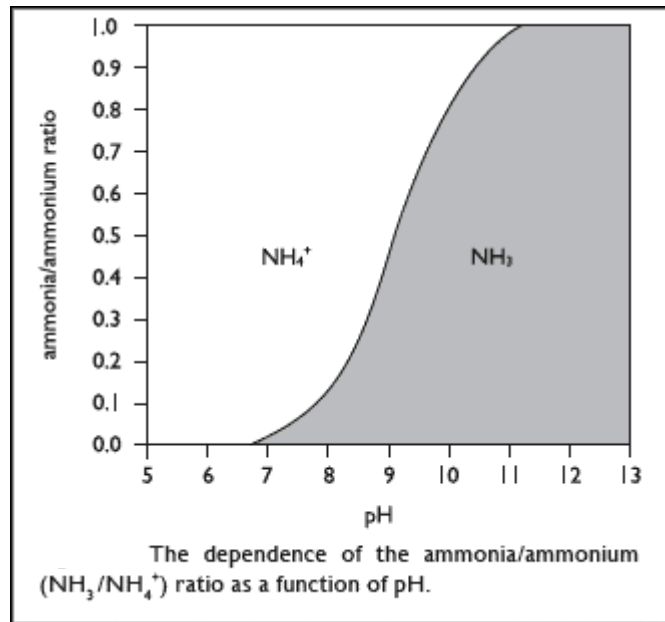
Many of the VOC control strategies mentioned above are also effective in controlling ammonia emissions. Of these strategies much research has confirmed the ability of acidifying litter amendments such as Alum (aluminum sulfate), Poultry Litter Treatment (PLT, sodium bisulfate), Poultry Guard (clay material containing sulfuric acid), phosphoric acid, etc. to reduce ammonia volatilization.

Ammonia emissions are greatly influenced by litter pH. Once formed, the ammonia will be in one of two forms: as the uncharged form of ammonia (NH<sub>3</sub>) or the ammonium ion (NH<sub>4</sub><sup>+</sup>), which is nonvolatile. Ammonia is also less soluble in water than the ammonium ion. Under acidic conditions (pH values of less than 7.0) ammonium is the predominate species, and ammonia volatilization occurs at a lower rate than at higher pH values. However, some ammonia volatilization occurs even under moderately acidic conditions. Volatilization of ammonia increases with increasing pH. Uric acid decomposition occurs most rapidly under alkaline (pH>7) conditions. Uricase, the enzyme that catalyzes uric acid breakdown, has maximum activity at a pH of 9. One principal ureolytic bacterium, *Bacillus pasteurii*, cannot grow at neutral pH, but thrives in litter above pH 8.5.<sup>15</sup> The litter pH in a broiler house can range between 8.5 and 10.0, which results in fairly rapid ammonia volatilization.

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<sup>15</sup> Alabama Cooperative Extension, ANR-1199 April 2001





All acidifying litter amendments work in a similar manner. The free hydrogen ions ( $\text{H}^+$ ) that exist under acidic conditions react with ammonia to form nonvolatile ammonium ions. The ammonium then reacts with sulfate ions to form ammonium sulfate ( $(\text{NH}_4)_2\text{SO}_4$ ), a water-soluble fertilizer. Because of these reactions, the amount of ammonia emitted from the litter will be reduced and the nitrogen (N) content of the litter will increase, which may make it more valuable as a fertilizer.

Acidifying litter amendments are generally most effective the first three weeks after application. Since poultry manure is alkali, the continual addition of more manure to the litter will counteract the acidifying affect of the amendments, eventually raising the pH above neutral. Although these products are typically only applied at the beginning of the grow-out cycle, it is possible to reapply some acidifying litter amendments such as PLT (a non-toxic product) to reduce pH and provide further ammonia control after the birds have been placed. Dry alum activates more quickly if sufficient moisture is present (>18%). Because of this more growers are currently using liquid alum (which doesn't need moisture to activate) than dry alum.<sup>16</sup>

Research has shown that alum can be used to reduce ammonia emissions by 70%.<sup>16</sup> A flux chamber study by Moore, USDA (1997b) demonstrated the use of alum reduced ammonia emissions by 97% during the 1<sup>st</sup> four weeks of grow-out and 75% during for the full 6 weeks. These results were confirmed by Brewer in 1998 (1999 Poultry Science Journal 78:692-698). McWard and Taylor found that all acidifying litter treatments worked to reduce ammonia emissions for up to four weeks and found little difference in the effectiveness of the treatments that they tested (alum, sodium bisulfate, and acidified clay) (2001 Journal of Applied Poultry Research Vol. 9, No. 4). A study by Moore, Daniel, Edwards, and Miller on the "Effect of Chemical Amendments on Ammonia Volatilization from Poultry Litter" showed that alum reduced ammonia volatilization by up to 99% vs. untreated litter (American

<sup>16</sup> Dr. Philip Moore, Jr., USDA/ARS, Fayetteville, Arkansas

Society of Agronomy, Mar/Apr 1995 v. 24(2) pg. 293-300). Terzich (1998) reported that sodium bisulfate significantly reduced litter pH and ammonia emissions.

Operating Schedule:

The typical operating schedule for the facility is 24 hours per day, 7 days per week, and 12 months per year.

**III. EQUIPMENT LISTING:**

12 new mechanically ventilated broiler houses for 397,440 birds (33,120 birds/house) (177 total combined hp)

Each House

One 460' L X 54' W mechanically ventilated broiler house with capacity for 33,120 birds

Ten 52" tunnel ventilation exhaust fans (1 hp each)

One 48" exhaust fan (1 hp)

One 36" exhaust fan ( $\frac{3}{4}$  hp)

Six 24" circulating fans ( $\frac{1}{2}$  hp each)

14.75 total electric hp

Proposed Modification:

C-5439-1-1: MODIFICATION OF 1,280,000 BROILER HEN RANCH, CONSISTING 48 NATURALLY/MECHANICALLY VENTILATED BROILER HOUSES, INCLUDING ELECTRIC FANS TOTALING 480 HP: ADD 397,440 BROILERS AND 12 MECHANICALLY VENTILATED BROILER HOUSES

Post Project Equipment Description:

C-5439-1-1: 1,677,4400 BROILER HEN RANCH, CONSISTING 60 NATURALLY/MECHANICALLY VENTILATED BROILER HOUSES, INCLUDING ELECTRIC FANS TOTALING 657 HP

**VI. EMISSION CONTROL TECHNOLOGY EVALUATION**

**A. BACT Applicability**

Pursuant to District Rule 2201, Sections 4.1.1 and 4.1.2, BACT shall be applied to a new, relocated, or modified emissions unit if the new or relocated unit has a Potential to Emit (PE) exceeding two pounds in any one day or the modified emissions unit results in an Adjusted Increase in Permitted Emissions (AIPE) exceeding 2 lb/day for NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub>, CO, VOC, or NH<sub>3</sub>. For CO emissions, the CO Post-project Stationary Source Potential to Emit (SSPE2) must also exceed 200,000 lb/year to trigger BACT.

As shown in section VII.C.1 of the engineering evaluation and the table below, each of the proposed new broiler houses will result in a PE of 2.3 lb/day for VOC and 8.7 lb/day for NH<sub>3</sub>. Therefore, BACT is triggered for VOC and NH<sub>3</sub> emissions.

<b>Post Project Potential to Emit (PE2) (lb/day)</b>						
	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	CO	VOC	NH <sub>3</sub>
New Broiler House for 33,120 birds	0	0	1.8	0	2.3	8.7
BACT triggered?	No	No	No	No	Yes	Yes

## **B. BACT Policy**

Per District Policy BACT APR 1305-1, Section IX, “A top-down BACT analysis shall be performed as a part of the Application Review for each application subject to the BACT requirements pursuant to the District’s NSR Rule.” For source categories or classes covered in the BACT Clearinghouse, relevant information under each of the steps may be simply cited from the Clearinghouse without further analysis.

## **C. Achieved in Practice Determination**

The U.S. Environmental Protection Agency (USEPA) RACT/BACT/LAER Clearinghouse, the California Air Pollution Control Officers Association (CAPCOA) BACT Clearinghouse, the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) BACT Clearinghouse, the Bay Area Air Quality Management District (BAAQMD), and the South Coast Air Quality Management District (SCAQMD) BACT Guidelines were reviewed to determine potential control technologies for this class and category of operation. No BACT guidelines were found for this class and category of source. No prohibitory rules specifically regulating this category of source were identified for any California air district.

## **D. Best Available Control Technology (BACT) Analysis for Permit Unit C-5439-1-1**

### **BACT Analysis for VOC Emissions:**

#### **Step 1 - Identify All Possible Control Technologies**

The control technology options include:

- Option 1. Emissions from Broiler House controlled by Carbon Adsorption
- Option 2. Emissions from Broiler House controlled by Thermal Incineration
- Option 3. Emissions from Broiler House controlled by Catalytic Incineration
- Option 4. Emissions from Broiler House controlled by a Biofilter capable of achieving 80% control
- Option 5. Total house cleanout after two flocks (3 times per year)
- Option 6. Total house cleanout after one flock (6 times per year)
- Option 7. Animals fed in accordance with National Research Counsel (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations

- Option 8. Broiler House Construction and Management Practices
  - 1. Insulated & mechanically ventilated poultry house +
  - 2. Mortality removed twice per day +
  - 3. Evaporative cooling pads to regulate house temperature +
  - 4. Mixing Fans
- Option 9. Usage of probiotics

**Step 2 – Eliminate Options**

Option 5 (Total house cleanout after two flocks (3 times per year)) and Option 6 (Total cleanout after one flock) will be eliminated from consideration at this time. Although more frequent removal of litter from the broiler houses would result in less emissions from the house, it is likely that these emissions would merely be shifted to litter storage areas. Unless the litter storage areas were controlled, there would be no emission reductions. Additionally, as a particulate matter control, the facility’s Conservation Management Practice (CMP) plan requires that the litter be used for at least two flocks. More frequent cleanouts would cause a greater amount of direct PM<sub>10</sub> emissions to the atmosphere.

Option 9 (use of probiotics) will be eliminated from consideration at this time. Although this method shows some promise, more research is needed to verify the emission reductions. Probiotics are living organisms and their ability to inhibit emissions is likely to be affected by many variables. These variables have not yet been identified to an extent that would insure that emissions would be decreased in cases in which probiotics are used.

**Step 3 – Rank Remaining Control Technologies by Control Effectiveness**

Control technologies for VOC:

VOC Emission Control Technology Rankings		
Rank	Control Efficiency	Status
1) Thermal Incineration	98% <sup>17</sup>	Technologically Feasible
2) Catalytic Incineration	95% <sup>18</sup>	Technologically Feasible
3) Carbon Adsorption	95% <sup>19</sup>	Technologically Feasible
4) Biofiltration	80% <sup>20</sup>	Technologically Feasible

<sup>17</sup> OAQPS Control Cost Manual, 4th Edition, EPA 450/3-90-006, January 1990, page 3-8.

<sup>18</sup> EPA-456/R-95-003, Survey of Control Technologies for Low Concentration Organic Vapor Gas Streams, Control Technology Center, May 1995, section 2.1, Catalytic Incineration, pages 13-16. The 95% value used is based upon EPA permit No. 23GS-93-OT-1 for 3M Company in St. Paul for an ARI, Econ-Abator catalytic oxidizer, Emission Point No. 2.

<sup>19</sup> EPA-456/R-95-003, Survey of Control Technologies for Low Concentration Organic Vapor Gas Streams, Control Technology Center, May 1995, Section 3, Adsorption, pages 45 - 46.

<sup>20</sup> According to the SCAQMD Rule 1133.2 final staff report (page 18) “Technology Assessment Report states a well designed, well operated, and well-maintained biofilter is capable of achieving 80% destruction efficiency for VOC and NH<sub>3</sub>.”

VOC Emission Control Technology Rankings		
Rank	Control Efficiency	Status
5) Broiler House Construction and Foster Farms Management Practices	15% <sup>21</sup>	Achieved in Practice
6) Acidifying Litter Amendments	15% <sup>22</sup>	Technologically Feasible
7) Animals fed in accordance with National Research Counsel (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations	9% <sup>23</sup>	Achieved in Practice

#### Step 4 - Cost Effectiveness Analysis

##### Thermal & Catalytic Incineration:

The following cost analysis demonstrates that the cost of natural gas alone, not including any capital costs, causes catalytic incineration to exceed the District VOC cost effective threshold. The temperature required for catalytic incineration is 600 °F. The temperature required for thermal incineration is 1,400 °F. Since the fuel requirements and fuel cost for thermal incineration are greater than catalytic incineration, the following analysis also demonstrates that thermal incineration would not be cost effective.

##### Broiler House Air Flow Rate

In order to effectively calculate the costs of this control option, the broiler house airflow rate must be determined. According to the applicant, the broiler house airflow rate can range from 2,700 cfm (new chicks on a cold night) to 212,000 cfm (mature birds on a hot day). Typical flow rates are 70,000 cfm in the spring and fall, 100,000 cfm in the summer, and 40,000 cfm in the winter. For more conservative calculations, an average airflow rate of 40,000 cfm will be assumed for the broiler houses.

##### Fuel Requirement:

The gas leaving the broiler house is principally air, with a volumetric specific heat of 0.0194 Btu/scf - °F under standard conditions.

$$\text{Natural Gas Requirement} = (\text{flow})(C_{p\text{Air}})(\Delta T)(1-\text{HEF})$$

Where:

<sup>21</sup> Estimate based on the ability of the computer-controlled, enclosed, mechanically ventilated broiler house to maintain lower litter moisture, which inhibits microbial action leading to VOC emissions.

<sup>22</sup> Conservative estimate based on the ability of lower pH to inhibit microbial action leading to VOC emissions

<sup>23</sup> Assuming that undigested protein in bird excrement, which emits VOCs during decomposition, can be reduced 15% by feeding with NRC guidelines and that 60% of VOC emissions are from decomposition of excrement in the litter (CARB emissions report states that propane and vinyl acetate emissions, which compose 28.9% of total VOC emissions, are likely from propane heaters, feed and supplements, and off-gassing from house materials. Some emissions are also from fermentation of the feed.)

Flow (Q) = exhaust flow rate of VOC broiler house exhaust: 40,000 ft<sup>3</sup>/hr

C<sub>p</sub><sub>Air</sub> = specific heat of air: 0.0194 Btu/scf - °F

ΔT = increase in the temperature of the contaminated air stream required for catalytic oxidation to occur (It will be assumed that the air stream would increase in temperature from 100 °F to 600 °F.)

HEF = heat exchanger factor: 0.7

$$\begin{aligned}\text{Natural Gas Requirement} &= (40,000 \text{ scf/hr})(0.0194 \text{ Btu/scf} - \text{°F})(600 \text{ °F} - 100 \text{ °F}) \\ &\quad (1-0.7) \\ &= \mathbf{116,400 \text{ Btu/hr}}\end{aligned}$$

#### Fuel Cost for Incinerator:

The cost for natural gas shall be based upon on an average taken from February 2005 to August 2005 from the Oil Energy website: <http://www.oilenergy.com/1gnymex.htm#year>

Cost for gas = \$7.34/MMBtu

The oxidizer is assumed to operate 24 hours per day and 300 days per year.

The fuel costs to operate the incinerator are calculated as follows:

$$\begin{aligned}116,400 \text{ Btu/hr} \times 1 \text{ MMBtu}/10^6 \text{ Btu} \times 24 \text{ hr/day} \times 300 \text{ day/year} \times \$7.34/\text{MMBtu} &= \\ &= \mathbf{\$6,152/\text{house-year}}\end{aligned}$$

#### VOC Emission Reductions

The California Air Resources Board (CARB) has performed a source test on the Foster Farms Broiler operation that resulted in a VOC emission factor of 0.0248 lb-VOC/bird-year. Foster Farms is constructing enclosed computer-controlled broiler houses. Both humidity and water usage are monitored in the houses. Since the moisture control exceeds the industry standard, the emission factor is considered 15% lower than industry standard and must be increased to industry standard for cost analysis purposes.

$$\begin{aligned}\text{VOC emissions} &= (0.0248 \text{ lb-VOC/bird-year}) (1/0.85) (33,120 \text{ bird/house}) \\ &= \mathbf{947 \text{ lb-VOC/house-year}}\end{aligned}$$

#### Cost of VOC Emission Reductions

$$\begin{aligned}\text{Cost of reductions} &= (\$6,152/\text{year-house})/((947 \text{ lb-VOC/year})(1 \text{ ton}/2000 \text{ lb})) \\ &= \mathbf{\$12,993/\text{ton of VOC reduced}}\end{aligned}$$

As shown above, the natural gas cost alone for thermal or catalytic incineration would cause the cost of the VOC reductions to be greater than the \$5,000/ton cost

effectiveness threshold of the District BACT policy. The equipment is therefore not cost effective and is being removed from consideration at this time.

### **Carbon Adsorption:**

Carbon adsorption occurs when air that contains contaminants is blown through a carbon unit and the pollutants are adsorbed onto the surface in the variously sized pores in the activated carbon unit.

Two main areas of cost are the cost of the device itself, and the operating cost of the carbon adsorption system.

The following cost analysis demonstrates that the cost of activated carbon alone, not including any other costs, causes carbon adsorption to exceed the District cost effective threshold. Treated activated carbon can control both VOC and ammonia emissions. Although, this technology can control both pollutants, a cost effective threshold has not been established for ammonia. Therefore, only achieved-in-practice options will be considered for ammonia at this time and a multi-pollutant cost effective analysis for VOC and ammonia will not be performed.

### **VOC Emission Reductions**

$$\begin{aligned} \text{VOCs controlled} &= 0.0248 \text{ lb-VOC/bird-year} \times 33,120 \text{ bird/house} \times 0.95 \\ &= \mathbf{780.3 \text{ lb-VOC/house-year}} \end{aligned}$$

$$\begin{aligned} \text{Adjusted to industry standard} &= \mathbf{780.3 \text{ lb-VOC/house-year}} \times (1/0.85) \\ &= \mathbf{918 \text{ lb-VOC/house-year}} \end{aligned}$$

### **Amount of Activated Carbon Required for VOC Control**

Carbon can adsorb 20% of its weight in VOCs.<sup>24</sup>

$$\begin{aligned} \text{Carbon required} &= (\mathbf{918 \text{ lb-VOC/year}}) \times 1 \text{ lb-Carbon}/0.2 \text{ lb-VOC} \\ &= \mathbf{4,590 \text{ lb-carbon/year}} \end{aligned}$$

### **Cost for Activated Carbon for VOC Control:**

Assuming a price for carbon of \$1.00/lb\*

\*Note: from GEAR 12 - Motor Vehicle and Mobile Equipment Coating Operations: Actual cost estimate was \$2.00/lb. An amount of \$1.00/lb was assumed to be conservative.

$$\text{Carbon cost} = \mathbf{4,590 \text{ lb-carbon/yr}} \times \mathbf{\$1.00/lb} = \mathbf{\$4,590/house-year}$$

### **Cost of VOC Emission Reductions**

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<sup>24</sup> District GEAR 9 - Soil Remediation Project Utilizing an Activated Carbon System

$$\begin{aligned} \text{Cost of reductions} &= (\$4,590/\text{house-year})/((918 \text{ lb-VOC/yr})(1 \text{ ton}/2000 \text{ lb})) \\ &= \mathbf{\$10,000/\text{ton of VOC reduced}} \end{aligned}$$

As shown above, the cost of the activated carbon alone for carbon adsorption would cause the cost of the VOC reductions to be greater than the \$5,000/ton cost effectiveness threshold of the District BACT policy. Therefore, this option is not cost effective and is being removed from consideration at this time.

**Biofiltration:**

Biofiltration is a method of reducing pollutants in which exhaust air that contains contaminants is blown through a media (e.g., soil, compost, wood chips) that supports a microbial population. The microbes utilize the pollutants such as VOCs and ammonia as nutrients and oxidize the compounds as they pass through the filter.

The following cost analysis demonstrates that the cost of biofiltration exceeds the District cost effective threshold. Biofiltration can control both VOC and ammonia emissions. Although, this technology can control both pollutants, a cost effective threshold has not been established for ammonia. Therefore, only achieved-in-practice options will be considered for ammonia at this time and a multi-pollutant cost effective analysis for VOC and ammonia will not be performed.

Costs

The cost estimate for a biofiltration system is taken from the University of Minnesota Extension Service Biosystems and Agricultural Engineering Update “Biofilter Design Information” (March 2004). The cost is largely dependent on the airflow rate that the filter must handle. The University of Minnesota publication states “Biofilters used to treat ventilating air exhausted from a livestock building should be sized to treat the maximum ventilation rate, which is typically the warm weather rate, of the building.” According to the applicant, the broiler house airflow rate can range from 2,700 cfm (new chicks on a cold night) to 212,000 cfm (mature birds on a hot day). The maximum airflow rate for the house is calculated as follows:

Maximum Airflow Rate

10 fans @ 26,800 cfm	= 268,000 cfm
1 fan @ 18,300 cfm	= 18,300 cfm
1 fan @ 9,000 cfm	= 9,000 cfm
Total	= 295,300 cfm

As shown above, the maximum airflow rate for each house is about 295,300 cfm. However, for more conservative calculations a maximum airflow rate of 212,000 will be assumed for this cost analysis.

Capital Cost



The cost of the biofilter includes the costs of the fans, media, ductwork, plenum, and labor. The University of Minnesota publication gives a capital cost between \$150 and \$250 per 1,000 cfm. An average cost of \$200 per 1,000 cfm will be assumed for this cost analysis.

The capital cost of the biofilter is calculated as follows:

$$\$200/1,000 \text{ cfm} \times 212,000 \text{ cfm} = \$42,400$$

Pursuant to District Policy APR 1305, section X (11/09/99), the cost for the purchase of the biofilter will be spread over the expected life of the system using the capital recovery equation. Although, the biofilter media (e.g., soil, compost, wood chips) must be replaced after 3-5 years, this does not constitute a significant cost of the system. Therefore, the expected life of the system (fans, media, ductwork, plenum, etc) is estimated at 10 years. A 10% interest rate is assumed in the equation and the assumption will be made that the equipment has no salvage value at the end of the ten-year cycle.

$$A = [P \times i(1+i)^n] / [(1+i)^n - 1]$$

Where: A = Annual Cost  
P = Present Value  
I = Interest Rate (10%)  
N = Equipment Life (10 years)

$$A = [\$42,400 \times 0.1(1.1)^{10}] / [(1.1)^{10} - 1]$$

$$= \mathbf{\$6,900/\text{year}}$$

#### VOC Emission Reductions

$$\text{VOCs controlled} = 0.0248 \text{ lb-VOC/bird-year} \times 33,120 \text{ bird/house} \times 0.80$$

$$= 657.1 \text{ lb-VOC/house-year}$$

$$\text{Adjusted to industry standard} = 657.1 \text{ lb-VOC/house-year} \times (1/0.85)$$

$$= \mathbf{773 \text{ lb-VOC/house-year}}$$

#### Cost of VOC Emission Reductions

$$\text{Cost of reductions} = (\$6,900/\text{house-year}) / ((773 \text{ lb-VOC/yr})(1 \text{ ton}/2000 \text{ lb}))$$

$$= \mathbf{\$17,852/\text{ton of VOC reduced}}$$

As shown above, the capital cost alone for a biofilter would cause the cost of the VOC reductions to be greater than the \$5,000/ton cost effectiveness threshold of the District BACT policy. Therefore, this option is not cost effective and is being removed from consideration at this time.

The facility is proposing completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions (e.g. temperature, humidity, ventilation) within the houses. The facility is also proposing to feed all birds in accordance with National Research Counsel (NRC) or other District-approved guidelines and to remove all mortality from houses twice per day. Since there is not a more effective control option, no further cost analysis is required.

### **Step 5 - Select BACT**

BACT for VOC for this operation is determined to be completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions (e.g. temperature, humidity, ventilation) within the houses; feeding all birds in accordance with National Research Counsel (NRC) or other District-approved guidelines; and removal of all mortality from houses twice per day.<sup>25</sup>

### **BACT Analysis for NH<sub>3</sub> Emissions:**

#### **Step 1 - Identify All Possible Control Technologies**

The control technology options include:

- Option 1. Emissions from Broiler House controlled by Carbon Adsorption
- Option 2. Emissions from Broiler House controlled by Thermal Incineration
- Option 3. Emissions from Broiler House controlled by Catalytic Incineration
- Option 4. Emissions from Broiler House controlled by a Biofilter capable of achieving 80% control
- Option 5. Total house cleanout after two flocks (3 times per year)
- Option 6. Total house cleanout after one flock (6 times per year)
- Option 7. Animals fed in accordance with National Research Counsel (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations
- Option 8. Broiler House Construction and Management Practices
  - 1. Insulated & mechanically ventilated poultry house +
  - 2. Mortality removed twice per day +
  - 3. Evaporative cooling pads to regulate house temperature +
  - 4. Mixing Fans

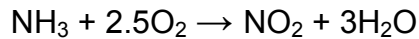
#### **Step 2 – Eliminate Options**

Option 1 (Emissions from Broiler House controlled by Carbon Adsorption) will be eliminated from consideration at this time. Although this option is technologically feasible, no uses of carbon adsorption to control broiler house ammonia emissions were identified. Since a cost effective threshold has not been established for ammonia, only achieved-in-practice options will be considered for ammonia at this time.

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<sup>25</sup> Total control efficiency of management practices and feeding with NRC guidelines=1-[(1-0.15) x (1-0.09)] =22.7%

Option 2 (Emissions from Broiler House controlled by Thermal Incineration) and Option 3 (Emissions from Broiler House controlled by Catalytic Incineration) will be eliminated from consideration at this time. Although these options are technologically feasible, no uses of thermal or catalytic incineration to control broiler house ammonia emissions were identified. Since a cost effective threshold has not been established for ammonia, only achieved-in-practice options will be considered for ammonia at this time. It should also be noted that incineration is an oxidation process. The most likely by product of the oxidation of ammonia would be NO<sub>x</sub>. The following equation demonstrates the likely reaction:



The molecular weights of NH<sub>3</sub> and NO<sub>2</sub> are 17 and 46, respectively; therefore, for every pound of ammonia eliminated 2.7 pounds of NO<sub>x</sub> (a precursor for ozone, and according to modeling results, a more significant precursor of PM<sub>10</sub> and PM<sub>2.5</sub> than NH<sub>3</sub>) could be generated. This is an additional reason to eliminate incineration as a control for ammonia.

Option 4 (Emissions from Broiler House controlled by a Biofilter) will be eliminated from consideration at this time. Biofiltration is widely used to control emissions from enclosed buildings where pigs are raised and have been used in Minnesota to control emissions from enclosed cow housing areas and composting facilities. At West Virginia University in 2003, a bench scale biofilter for 33 birds was evaluated for removal of ammonia from poultry house exhaust. The biofilter provided 95% control of ammonia emissions.<sup>26</sup> However, biofilters have not yet been used for poultry facilities on a large scale and although this option is technologically feasible, no uses of biofiltration to control broiler house ammonia emissions were identified. Since a cost effective threshold has not been established for ammonia, only achieved-in-practice options will be considered for ammonia at this time.

Option 5 (Total house cleanout after two flocks (3 times per year)) and Option 6 (Total cleanout after one flock) will be eliminated from consideration at this time. Although more frequent removal of litter from the broiler houses would result in less emissions from the house, it is likely that these emissions would merely be shifted to litter storage areas. Unless the litter storage areas were controlled, there would be no emission reductions. Additionally, one of the major reasons for regulating ammonia is that it is a precursor for PM<sub>10</sub> and PM<sub>2.5</sub>. As a particulate matter control, the facility's Conservation Management Practice (CMP) plan requires that the litter be used for at least two flocks. More frequent cleanouts would cause a greater amount of direct PM<sub>10</sub> emissions to the atmosphere.

### **Step 3 – Rank Remaining Control Technologies by Control Effectiveness**

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<sup>26</sup> [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=12602826&dopt=Abstract](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12602826&dopt=Abstract)

Control technologies for NH<sub>3</sub>:

### Acidifying Litter Amendments

The ammonia emission reductions caused by the usage of acidifying litter amendments are usually reported in terms ppmv inside the broiler house. Although these litter amendments have consistently shown significant reductions in ppmv levels in the house (50% reductions in average ppmv level over the grow-out period), it may not be possible to directly correlate these reductions to pounds of ammonia emitted since the house ventilation rate constantly changes.

Arkansas research has shown that alum application rates of 130-260 lb per ton of litter reduced ammonia-N emissions from 28 lb per ton of litter to less than 1 lb per ton of litter over the grow-out period (96.4% control).<sup>27</sup> However, this may be the result of an atypically high application rate.<sup>26</sup>

Brewer (1988) estimated that the total nitrogen release over the grow-out period from a poultry house with 20,000 broilers was 296 kg (as NH<sub>3</sub>) for an untreated house and 131 kg (as NH<sub>3</sub>) for an alum-treated house (55.7% control). It is estimated that there are about 6.7 grow-out cycles per year (used to develop CARB emission factor). The resulting emission factor for an alum-treated house is calculated as follows:

$$(131 \text{ kg-NH}_3/\text{growout-house}) \times (2.2 \text{ lb/kg}) \times (6.7 \text{ growout/year}) \div (20,000 \text{ bird/house}) \\ = \mathbf{0.0965 \text{ lb-NH}_3/\text{bird-year}}$$

Moore states that a typical poultry house will lose about two tons of nitrogen each year as ammonia but an alum-treated house will only lose about 1,000 lb of nitrogen as ammonia (75% control).<sup>28</sup> The resulting emission factor for an alum-treated house is calculated as follows:

$$(1,000 \text{ lb-NH}_3/\text{house-year}) \div (20,000 \text{ bird/house}) = \mathbf{0.05 \text{ lb-NH}_3/\text{bird-year}}$$

Mcward and Taylor found similar ammonia emission reductions when comparing acidic, granular litter amendments such as sodium bisulfate, alum, and Poultry Guard.<sup>29</sup>

The emission reductions for acidifying litter amendments will be conservatively estimated at 0.0965 lb-NH<sub>3</sub>/bird-year and 50% control

### Broiler House Construction and Foster Farms Management Practice

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<sup>27</sup> Alabama Cooperative Extension, Agronomy Series – Alum in Poultry Litter (May, 2005)

<sup>28</sup> U.S. Water News Online – Aluminum Sulfate found to reduce ammonia, phosphorus in Poultry litter (February 2002)

<sup>29</sup> McWard, G. W. and D. R. Taylor, Acidified Clay Litter Amendment, Journal of Applied Poultry Research (2000)

The California Air Resources Board (CARB) has performed a source test on the Foster Farms Broiler operation that resulted in an ammonia emission factor of 0.0958 lb-NH<sub>3</sub>/bird-year. This emission factor falls within the range of emission factor estimates when acidifying litter amendments are used. Therefore, the two options will be considered equivalent.

<b>NH<sub>3</sub> Emission Control Technology Rankings</b>		
Rank	Control Efficiency	Status
3) Acidifying Litter Amendments	50%	Achieved in Practice
4) Broiler House Construction and Foster Farms Management Practices	50%	Achieved in Practice
5) Animals fed in accordance with National Research Counsel (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations	17% <sup>30</sup>	Achieved in Practice

**Step 4 - Cost Effectiveness Analysis**

All of the above options are achieved-in-practice; therefore a cost analysis is not required.

The facility is proposing completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions (e.g. temperature, humidity, ventilation) within the houses. The facility is also proposing to feed all birds in accordance with National Research Counsel (NRC) or other District-approved guidelines and to remove all mortality from houses twice per day. Since there is not a more effective control option, no further cost analysis is required.

**Step 5 - Select BACT**

BACT for NH<sub>3</sub> for this operation is determined to be completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions (e.g. temperature, humidity, ventilation) within the houses; feeding all birds in accordance with National Research Counsel (NRC) or other District-approved guidelines; and removal of all mortality from houses twice per day.<sup>31</sup>

<sup>30</sup> Assuming that nitrogen excretion, which leads to ammonia volatilization, can be reduced by 15% by feeding with NRC guidelines

<sup>31</sup> Total control efficiency of management practices and feeding with NRC guidelines=1-[(1-0.50) x (1-0.17)] =58.5%

# San Joaquin Valley Unified Air Pollution Control District

## Best Available Control Technology (BACT) Guideline X-XX\*

**Emission Unit:** Broiler House

**Industry Type:** Agriculture (poultry)

**Equipment Rating:** 33,120 birds/house

**Determination Date:**

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	<ol style="list-style-type: none"> <li>1. 22.7% control (completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses twice per day)</li> <li>2. 22.7% control (acidifying litter amendments; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses twice per day)</li> </ol>	<ol style="list-style-type: none"> <li>1. 98% control (Capture and Thermal Incineration)</li> <li>2. 95% control (Capture and Catalytic Incineration)</li> <li>3. 95% control (Capture and Carbon Adsorption)</li> <li>4. 80% control (Capture and Biofiltration)</li> </ol>	
NH <sub>3</sub>	<ol style="list-style-type: none"> <li>1. 58.5% control (completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses twice per day)</li> <li>2. 58.5% control (acidifying litter amendments; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses twice per day)</li> </ol>	<ol style="list-style-type: none"> <li>1. 80% control (Capture and Biofiltration)</li> </ol>	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

**\*This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

**San Joaquin Valley  
Unified Air Pollution Control District**

**Best Available Control Technology (BACT) Guideline X-XXA**

**Emission Unit:** Broiler House

**Equipment Rating:** 250 ton-onion/day

**Facility:** Foster Farms, El Dorado Ranch

**References:** ATC #: C-5439-1-1  
Project #: C-1051505

**Location:** 1324 South El Dorado Ave.  
Tranquility, CA.

**Date of Determination:**

Pollutant	BACT Requirements
NO <sub>x</sub>	
SO <sub>x</sub>	
PM <sub>10</sub>	
CO	
VOC	22.7% control (completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses twice per day) (Achieved in Practice)
NH <sub>3</sub>	58.5% control (completely enclosed mechanically ventilated broiler housing with evaporative cooling pads, mixing fans, and a computer control system using thermostats, sensors, and timers to control environmental conditions; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses twice per day) (Achieved in Practice)

**BACT Status:**    X    Achieved in practice    \_\_\_    Small Emitter    \_\_\_T-BACT  
 \_\_\_    Technologically feasible BACT  
 \_\_\_    At the time of this determination achieved in practice BACT was equivalent to  
 technologically feasible BACT  
 \_\_\_    Contained in EPA approved SIP  
 \_\_\_    The following technologically feasible options were not cost effective:  
 \_\_\_    Alternate Basic Equipment  
 \_\_\_    The following alternate basic equipment was not cost effective:

Mail to: CAPCOA BACT Clearinghouse Project Assessment Branch P.O. Box 2815 Sacramento, CA 95812	For CAPCOA use only Record No.: ; Form No.: ; BLIS District Code: Codes - EPA Source: ; SCAQMD: ; EPA ID No.: ARB Sc: , Ctrl: ; BLIS Process: ; AIRS Facility No.:
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**CAPCOA BACT DETERMINATION REPORTING FORM**

**Instructions:** Complete this form when issuing an authority to construct. Please use one form per determination (i.e. pollutant). Please use one form per determination (i.e. pollutant) Section A need only be completed on one form in the case of a source with multiple determinations. See the reverse side for descriptions of the field identifiers used below. Please attach a copy of the permit or permit conditions if practical. Please call (916)327-5601 for clarification of any questions. (1/5/94)

**SECTION A. Source Information**

Company and Project Name: Harris Fresh, LLC

Facility Address: PO Box 497 21960 S. Fresno-Coalinga Hwy. SIC Code: 723  
Coalinga, CA 93210

Application No.: C-1044198 ; Authority to Construct No.: C-6188-1-0 Authority to Construct Issue Date: June 2, 2005

District: SJVUAPCD ; District Contact: David Warner; Phone No.: (559) 230-5900

Est. Startup Date: June 2005 ; Today's Date: June 1, 2005 Permit Unit Status: New

Basic Equip./Process (include make and model): Fresh Onion grading and packing

Rated Capacity: 250 ton-onion/day ; Output: N/A ; SCC Code:

Fuel Type: n/a ; Backup Fuel(s): N/A ; Project Cost: \$

**SECTION B. Control Data** Pollutant: PM10

Control Equip. none

Emissions: Uncontrolled: 150 lbm/day Controlled Limit: 4.5 lbm/day

Enforceable Permit Emissions Limit(s): 250 ton-onion/day, 0.018 lb-PM10/ton

Emission Type: point; Cost of Control Equipment: \$5,000 for filter assembly

Regulatory Requirement: *District-Defined BACT* *District-Defined LAER* *Other: N/A*

BACT/LAER Specification: Reference or Basis: SJVUAPCD

Mass Emission Rate: ; Destruction efficiency (%): N/A

Normalized Mass Emission Rate: N/A lbm/MMBtu; N/A g/bhp-hr; 0.018 lbm per ton input

Emission Concentration: 0.005 gr/dscf at 9,240 scfm

Other: N/A

Method of Compliance Verification: recordkeeping

Other Relevant Permit Limits: Time of Operation: N/A

Fuel use: N/A Percent Capacity/Use: Seasonal  
Throughput: N/A  
Other: N/A

Remarks:



**APPENDIX A**  
**Foster Farms Management Practices**



## Practices to Control Emissions

1. Litter
  - a. We grow six broods per house per year.
  - b. Litter is completely cleaned out of houses twice/year.
  - c. Four times per year the litter is screened after the flock is shipped out to remove caking and large clumps of litter.
  - d. Chicks are kept in half of a house for 10 days (always on new litter) then released to the whole house.
  
2. Ventilation
  - a. Ventilation standards are set to remove moisture from a house based on number of birds, age, ambient temperature and humidity.
  - b. Propane heaters and water-cooled pads are used to maintain a temperature-controlled environment.
  
3. Management
  - a. Each flock is inspected a minimum of two times per day.
  - b. All mortality is removed from the house daily.
  - c. Water, feed and ventilation equipment are inspected daily.
  - d. Litter tackiness is inspected daily and ventilation rates adjusted if necessary.
  - e. There is a standby generator in the event of a power failure. The generator is tested every week.
  
4. Water
  - a. Water consumption is monitored daily.
  - b. Water lines are inspected daily.
  - c. Water lines are flushed and cleaned weekly.
  
5. Speed Limit
  - a. The speed limit on all Foster Farms ranches is 10 mph.
  - b. Speed limit signs are posted on every ranch.
  
6. Biosecurity
  - a. All ranches are considered a biosecurity unit. Outside traffic without a permit is not allowed on our ranches.
  - b. Only the minimum amount of truck traffic to supply feed and to deliver and ship chickens is allowed on each ranch.
  
7. Proposed Ranches

Davis 1 and 2 and El Dorado (proposed ranches) will have paved driveways to the ranch and down the center alley.

**APPENDIX B**  
**Chemistry of Some Commercially Available Litter Amendments**

REPORT NUMBER

05-236-047

SEND TO:

FOSTER FARMS CHEMISTRY LAB  
14519 WEST COLLIER RD, BLDG A  
DELHI, CA 95315-

# A & L WESTERN AGRICULTURAL LABORATORIES, INC.

1211 WOODLAND AVENUE, SUITE #1 • MODESTO, CA 95351 • (209) 529-4000 • FAX (209) 529-4736



Client No: 2021-D

CUSTOMER

15667-MSP#13STATIC-8/23/05

SAMPLES SUBMITTED BY:

UMED SINGH

## ORGANIC AMENDMENT REPORT

LAB NO. 22200 DATE 08/30/2005 PAGE 1

REPORT OF ANALYSIS PERCENT											REPORT OF ANALYSIS-PARTS PER MILLION					
SAMPLE NUMBER	N NITRO-GEN	P PHOS-PHORUS	P-2O5 PHOS-PHATE	K POTAS-SIUM	K2O POTASH	S SULFUR	Mg MAG-NESIUM	Ca CALCIUM	Na SODIUM	Fe IRON	Al ALUMI-NIUM	Mn MANGA-NESE	Cu COPPER	Zn ZINC	B	
15667-100 8/23/05	3.14	0.96	2.20	1.670	2.012	0.360	0.500	1.750	0.420	6818	6516	442	419	297	64.0	

POUNDS OF NUTRIENTS/TON															
SAMPLE NUMBER	N NITRO-GEN	P PHOS-PHORUS	P-2O5 PHOS-PHATE	K POTAS-SIUM	K2O POTASH	S SULFUR	Mg MAG-NESIUM	Ca CALCIUM	Na SODIUM	Fe IRON	Al ALUMI-NIUM	Mn MANGA-NESE	Cu COPPER	Zn ZINC	B
15667-100	62.2	19.2	44.0	33.4	60.2	7.2	10.0	35.0	8.4	13.6	12.0	0.9	0.8	0.6	0.1

Reported on an as-received basis      Moisture =      %

Reported on a dry basis      Moisture = 12.43 %

Remarks:

AM-  
Vernon

pH = 6.5  
C:N Ratio = 9:1  
Humic Acid = 1.22 %  
Soluble Salts = 16.5 dS/m  
Organic Matter = 51.87 %

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This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

By:   
ROBERT BUTTNER