Eastern Kern Air Pollution Control District

RULE 410
ORGANIC SOLVENTS

STAFF REPORT

Draft April 29, 2022

Prepared by

Miguel Sandoval
Air Quality Engineer

Reviewed by

Glen Stephens, P.E.
Air Pollution Control Officer

Eastern Kern Air Pollution Control District
2700 "M" Street, Suite 302
Bakersfield, California 93301
(661) 862-5250 ● www.kernair.org

Table of Contents

I. INTRODUCTION

In Eastern Kern County monitored levels of ozone exceed National Ambient Air Quality Standards (NAAQS), which are set at levels that protect public health and welfare. Consequently, in 2021, the U.S. Environmental Protection Agency (EPA) classified Eastern Kern County's air quality as severe for its nonattainment designation for the federal 2008 eight-hour ozone NAAQS. The federal Clean Air Act (CAA) requires contingency measures if an ozone non-attainment area fails to meet Reasonable Further Progress (RFP) milestones or to attain the NAAQS by the established attainment date. The U.S EPA has requested that the Eastern Kern Air Pollution Control District (District) include an additional contingency measure in the Districts 2017 Ozone Attainment Demonstration Plan (OADP). Therefore, to comply with contingency measure, the District will require a reduction in volatile organic compound (VOC) emissions by implementing the solvent cleaning control measures to further reduce VOC emissions and introducing more stringent emission limits. The OADP for severe classification uses the VOC emissions reductions from this solvent cleaning control measure to project attainment.

The purpose of this rule project is to revise the emission limits for solvent usage requirements of rule 410 to obtain as much VOC emission reductions as is expeditiously practicable, technologically feasible, and economically reasonable, as determined by the District's Governing Board.

II. BACKGROUND

Rule 410 was last amended in November of 1979. Therefore, Rule 410 has ample opportunity to lower emission limits and establish more stringent controls. This rule applies to any source operation that uses organic solvents, with the exception of operations exempted under section VIII of the rule (generally, the manufacture or transport of organic solvents or any source operation that is subject to or exempted by another District rule). The purpose of this rule is to limit VOC emissions from the use of organic solvents. This Rule sets daily VOC emission limits for miscellaneous solvent usage operations including but not limited to, wipe cleaning, surface preparation, fuel line flushing, and miscellaneous degreasing operations. Rule 410 incorporates three different emission standards for the discharge of organic solvents. Paragraph I, limits the release of heated organic material to less than 15 pounds per day unless a control efficiency of 85 percent is achieved. Paragraph II, limits the discharge of photochemically reactive solvent to less than 40 pounds per day unless a control efficiency of at least 85 percent is achieved. Also, paragraph III, limits the release of non-photochemically reactive solvent to less than 3,000 pounds per day unless a control efficiency of 85 percent is achieved.

Provisions of amended Rule 410 are applicable to any miscellaneous source operations that utilize organic solvents as defined in Rule 410 and are not otherwise subject to VOC limits in any Regulation IV Rule including source specific coating rules under 410 series and Rule 432 Polyester Resins. Organic solvents containing VOCs include but not limited to, coatings, resin, adhesives, inks, thinners, diluents, mold seal, mold release, compounds, lubricants, cutting oils and quenching oils.

III. PROPOSED RULE AMENDMENTS

The California Health and Safety Code (CH&SC) Section 40914(b)(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, air districts must consider regulations that have been successfully implemented elsewhere. Districts 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 a district, along with the resources realistically available to a district to adopt, implement, and enforce the measures.”

In the context of rule development, District staff construes 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 compared 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 Best Available Control Technology (BACT) clearinghouses for the most recent control technology available for the source category. District determined the proposed amendments will be at least as stringent as currently required state and federal requirements.

Best Available Retrofit Control Technology (BARCT) Requirement provisions apply to sources which are subject to District permitting requirements and that emit or may emit one or more air pollutants. California law established an intermediate level of control that is the "best available" for "retrofit" to existing sources, recognizing that the state's air pollution problems may demand more effective pollution control than what is usually considered "reasonably available" (RACT-reasonably available control technology). BARCT characterizes a standard of emissions control for existing, traditional sources. Local air districts have adopted many rules to implement BARCT, including particulate control efficiency standards; limitations on exhaust pollutants; and technology-based requirements that dictate the use of a particular control device or something that is equally effective. The purposes of BACT and BARCT differ in that BACT is

designed to minimize the growth in future stationary source emissions and BARCT is designed to reduce current stationary source emissions. BACT is utilized in the permitting process on a case-by case basis, while BARCT is considered for application on an industry-wide basis in the rule development process.

Amendments to the proposed Rule incorporate two different types of emission control standards: performance standards and work practice standards. Performance Standards: The federal Clean Air Act's definition of "performance standards" refers to an allowable emission limit, meaning a limit on quantity of pollutant emitted over a specified period of time or a percent reduction. The allowable VOC emission limit for solvent used for solvent cleaning is specified. Work Practice Standards: Work practices refer to the management plans and procedures that would be undertaken to reduce emissions. Requiring that containers be covered except when adding or removing material from the container is one example of a work practice standard. The proposed new Rule in this project will identify at least one performance and work practice standard to limit VOC emissions.

A. **Proposed Amendments to Rule 410**

1. Section I (Applicability) this section would be added to match District formatting for other Rules.

2. Section II (Definitions) would have 14 definitions added. The exiting Rule only contains two definitions for "organic solvents" and "photochemically reactive solvent" respectively. The definition for "photochemicaly reactive solvent" will be retained and moved from section X to section II in the new Rule. Definition of organic solvent will be revised to echo definition of solvent used in Rule 410.3. The additional 14 definitions will be added as a reference to added language in Rule sections III through VI, including the following: APCO, CARB, Baked, Dissolver, EPA, Exempt compounds, Grams of VOC per liter, Heat-Cure or Heat Polymerized, Organic Solvent, SCAQMD, Standards Conditions, Thinner or Viscosity Reducer, and VOC.

3. *Section III (Exemptions)*
   The main goal for Exemptions section is to remove redundant and expired language to improve clarity of exempt operations. The current Rule was adopted in 1972 as primary means to regulate solvent usage for multiple source operations. However, since then, the District has developed source specific Rules aimed to control VOC emissions originating from source specific operations utilizing solvents. Therefore, under Section III, (Exemptions) the following language will be removed: "The use of equipment or surface coating material for which other requirements are specified by these Rules and Regulations" and replaced by a list of District source specific VOC Rules which contain independent requirements for

solvent usage/cleaning and thus, exempt from requirements of Rule 410. Additionally, old compliance schedule and rule references will be removed as these Rules have been renumbered and references to old Rule numbers are no longer relevant, these include: Rules 411, 412, 413, and 414.

4. *Section IV (Requirements)*
   A compliance date (six months from Rule adoption) will be listed and existing requirements will be left in place. There are currently three different thresholds: one for heated solvents, one for photochemically reactive solvents, and one for non-photochemically reactive solvents. All three of these would be phased out within six months of rule adoption to a single threshold of 833 pounds of VOC per calendar month. This is roughly equivalent to 27 pounds per day which is less than the current limit of 40 pounds per day. This threshold mirrors South Coast Air Quality Management District (SCAQMD's) and San Joaquin Valley Air Pollution Control District (SJVAPCD) rules for similar sources. A separate emission limit of 450 lbs per calendar month will be added as a contingency provision if District fails to attain the 2008 or 2015 8-hour ozone NAAQS. This is roughly equivalent to 10 pounds per day which is less than the current limit of 40 pounds per day. This provision would be effective on and after sixty days following the effective date of EPA final rulemaking that the District has failed to attain the 2008 ozone NAAQS by the applicable deadline.

   This threshold is based on emission levels required to achieve necessary emission reductions. In lieu of complying with the solvent VOC emission limits, operators may use an APCO-approved VOC emission control system that meets the specified control efficiency. A VOC capture and control efficiency will be required of 90% and 95% respectively. The proposed requirement would also set a minimum standard for any new sources that would be subject to this rule.

   Subsection will be added listing organic solvent storage and disposal requirements. Currently, standalone Rule 410.2, limits disposal of organic solvents to 1.5 gallons per day. Language in Rule 410 will entirely prohibit the disposal of organic solvent via intentional evaporation. Additionally, work practice standards will be explicitly added to Rule 410 for proper solvent storage and disposal practices. Rule 410.2 will be rescinded and repealed.

5. *Section V (Administrative Requirements)*
   In Section V (Administrative Requirements), language would be standardized and record retention provisions would be clarified. Record requirements for compliance with existing and new rule will be listed separately. The records retention requirement would be clarified. It is

proposed that records be retained on site and records submitted upon request. Although this was the intention of the provisions, it had not been stated as clearly in all of the rules. For VOC emission control systems, language would be revised to clarify the current requirements.

6. *Section VI (Test Methods)*
   The test method for determining the amount of daily VOC emissions would be listed in this section for clarity. The two test methods used for the VOC emission control system would be moved to a new subsection that would outline the calculation of overall capture and control efficiency. The current rule is not clear on how to perform the calculation. Test methods will mirror those required by SCAQMD and SJVAPCD.

IV. EMISSION REDUCTIONS

Emission reductions due to proposed amendment to Rule 410 are expected from the lower monthly VOC facility wide emission limit. Upon Rule amendment, if contingency measures are triggered the resulting total VOC emissions reduction will be 0.18 tons per day, which is about a 34% reduction to the adjusted 2012 baseline VOC emissions of 0.54 tons per day. Details of the analysis are in Appendix C of this report. Total emission reductions include emissions reductions from lower VOC emission limit for solvents used in miscellaneous operations (not regulated by other District specific coating and solvent rules).

The existing Rule has current emission limit for processes that use photo chemically reactive solvents of 40 lbs/day (or approximately 1,200 lbs/mo). Rule amendments are proposing to eventually lower this limit on a monthly basis of 450 lbs per month.

V. RULE CONSISTENCY ANALYSIS

Pursuant to Section 40727.2 of the California Health and Safety Code (CH&SC), prior to adopting, amending, or repealing a rule or regulation, the District is required to perform a written analysis that identifies and compares the air pollution control elements of amended Rules with the corresponding elements of existing or proposed District and EPA Rules, regulations, and guidelines that apply to the same source category. District staff found that facilities could comply with the proposed amendments to the Organic Solvents Rule as well as all other existing or proposed District Rules. District staff found that the proposed amendments and requirements of these Rules would not conflict with federal Rules, regulations, or policies covering similar stationary sources. The Rule consistency analysis is presented on Appendix D to the final draft staff report.

VI. COST EFFECTIVENESS ANALYSIS

The California Health and Safety Code 40920.6(a) requires the District to conduct a cost effectiveness analysis of available emission control options before adopting each BARCT Rule. The purpose of conducting a cost effectiveness analysis is to evaluate the economic reasonableness of the pollution control measure or Rule. The analysis also serves as a guideline in developing the control requirements listed in a Rule. Details of the cost and cost effectiveness analysis are in Appendix E of this report.

VII. SOCIOECONOMIC IMPACTS

CHSC Section 40728.5 exempts districts with a population of less than 500,000 persons from the requirement to assess the socioeconomic impacts of proposed Rules. Eastern Kern County population is below 500,000 persons. Additionally, this section does not apply to the adoption, amendment, or repeal of any Rule or regulation that results in any less restrictive emissions limits if the action does not interfere with the district's adopted plan to attain ambient air quality standards, or does not result in any significant increase in emissions." Proposed amendments do not significantly affect air quality, in the contrary amendments to Rule 410 are expected to strengthen emission limitations beyond those already enforced; therefore, no socioeconomic analysis is required.

VIII. ENVIRONMENTAL IMPACTS

Both the California Environmental Quality Act (CEQA) and CARB policy require an evaluation of the potential adverse environmental impacts of proposed amendments to Rule 410. District staff has concluded that the amendments to lower VOC emission limits will not have any significant adverse effects on the environment. The intent of Amended Rule 410 is to protect public health by reducing the public's exposure to potentially harmful VOC emissions which contribute to ground level ozone. Staff recommends filing a Notice of Exemption under the provisions of Public Resource Code 15061(b)(3).

IX. RULE APPROVAL PROCESS

The District will be accepting written comments and concerns from persons interested in proposed Amended Rule 410 for a period of 30 days following the workshop. The District anticipates that Amended Rule 201.1 will be considered for adoption by the Governing Board at the September 1, 2022, Board Hearing.

X. REFERENCES

1. South Coast Air Quality Management District – Rule 1171 “Solvent Cleaning Operations” adopted August 2, 1991, last amended July 14, 2006.

2. South Coast Air Quality Management District – Final Staff Report of Proposed Amended Rule 1171 – Solvent Cleaning Operations. June 2006.

3. South Coast Air Quality Management District – Staff Report for Proposed Amended Rule 1171 – Solvent Cleaning Operations. November 2003.

4. San Joaquin Valley Air Pollution Control District –Staff Report for Proposed Amendments to the Solvent Cleaning Portions of Eleven District Rules August, 2007

Remainder of Page Intentionally Left Blank

APPENDIX A:

PROPOSED REVISION RULE 410

ORGANIC SOLVENTS

RULE 410 **Organic Solvents** - Adopted 4/18/72, Amended 12/17/74, 11/27/79, XX/XX/2022

I. Applicability

The provisions of this rule shall apply to any source operation emitting Volatile Organic Compounds (VOC) from the use of organic solvents unless the source operation is exempted under Section III (Exemptions).

II. Definitions

A. APCO: as defined in Rule 102 (Definitions).

B. CARB: California Air Resources Board.

C. Baked: a process whereby the coated object is heated above ambient temperature to a temperature at or above 194°F for the purpose of curing or drying.

D. Dissolver: an organic solvent that is added to an adhesive, coating, or ink in order to melt or to liquefy solid particles.

E. EPA: United States Environmental Protection Agency.

F. Exempt Compounds: all organic compounds not classified as VOC, as listed in the definition of VOC in Rule 102 (Definitions).

G. Facility: the same as 'Stationary Source" as defined in Rule 210.1

H. Grams of VOC per liter of Material: the weight of VOC per volume of material and is calculated by the following equation:

$$\text{Grams of VOC per liter of material} = \frac{Ws - Ww - Wec}{Vm}$$

Where:

Ws	=	Weight of volatile compounds, in grams
Ww	=	Weight of water, in grams
Wec	=	Weight of exempt compounds, in grams
Vm	=	Volume of material, in liters.

I. Heat-Cured or Heat-Polymerized: heated to a temperature less than or equal to 194^{o}F for the purpose of curing a coating, ink or adhesive.

J. Organic Solvent: the same as "Solvent."

K. Photochemically Reactive Solvent: any organic solvent with an aggregate of more than 20% of its total volume composed of chemical compounds classified below or which exceeds any of the following individual percentage composition limitations referring to the total volume of solvent:

1. A combination of hydrocarbons, alcohols, aldehydes, esters, ethers or ketones having an olefinic or cycloolefinic type of unsaturation: five (5) percent; or

2. A combination of aromatic compounds with eight (8) or more carbon atoms to the molecule except ethylbenzene: eight (8) percent; or

3. A combination of ethylbenzene, ketones having branched hydrocarbon structures, or toluene: 20%.

   Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one (1) of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percentage of the total volume of solvents.

L. SCAQMD: South Coast Air Quality Management District.

M. Solvent: any liquid containing an organic compound or combination of organic compounds used as diluent, thinner, dissolver, viscosity reducer, cleaning agent, or other similar uses. These liquids are principally derived from petroleum and include petroleum distillates, chlorinated hydrocarbons, chlorofluorocarbons, ketones, and alcohols. Solutions, emulsions, and dispersions of water and soap, or water and detergent, are not considered organic solvents. Soaps and detergents are considered water based surfactants.

N. Standard Conditions: as defined in Rule 102 (Definitions).

O. Thinner or Viscosity Reducer: an organic solvent which is used to dilute coatings to reduce viscosity, color strength, and solids, or to modify drying conditions.

P. Volatile Organic Compound (VOC): The definitions contained in 40 CFR 51.100 shall apply, and are hereby incorporated by reference. In the event of any discrepancy between a definition contained in 40 CFR 51.100 and any definition specified above, the definition specified above shall control.

III. Exemptions

The provisions of this Rule shall not apply to:

A. The manufacture of organic solvents, or the transport or storage of organic solvents or materials containing organic solvents.

B. Provisions of this rule do not apply to coatings, coating removers (strippers), surface preparation material, and cleanup material specifically subject to the requirements of the following District rules:

1. 410.1A, Architectural Coating Controls;
2. 410.3, Organic Solvent Degreasing Operation;
3. 410.4, Metal, Plastic, and Pleasure Craft Parts and Products Coating Operations,

4. 410.4A, Motor Vehicle and Mobile Equipment Refinishing Operations,
5. 410.7, Graphic Arts;
6. 410.8, Aerospace Assembly and Coating Operations;
7. 410.9, Wood Products Surface Coating Operations;
8. 432, Polyester Resin.

C. The spraying or other employment of insecticides, pesticides or herbicides.

D. The employment, application, evaporation or drying of saturated halogenated hydrocarbons or perchloroethylene.

E. The use of any material, in any article, machine, equipment or other contrivance described in Sections IV.B, IV.C, and IV.D if:

1. the volatile content of the material consists only of water and organic solvents, and
2. the organic solvents content comprises not more than 20% by volume of the total volatile content, and
3. the volatile content is not photochemically reactive, and
4. the organic solvent does not come into contact with flame.

IV. Requirements

A. Sections IV.B through IV.E shall remain in effect until XX XX, 2023.

B. Solvents Subjected to Heat: A person shall not discharge into the atmosphere more than 15 pounds or organic materials in any 1 day from any article, machine, equipment, or other contrivance in which any organic solvent or any material containing organic solvent comes into contact with flame or is baked, heat-cured, or heat-polymerized in the presence of oxygen, unless said discharge has been reduced by a least 85 percent. These portions of any series of articles, machines, equipment, or other contrivances designed for processing continuous web, strip, or wire that emit organic materials in the course of using operations described in this Section shall be collectively subject to compliance with this Section.

C. Photochemically Reactive Solvents: A person shall not discharge into the atmosphere more than 40 pounds of organic materials in any 1 day from any article, machine, equipment or other contrivance used under conditions other than those described in IV.B for employing or applying any photochemically reactive solvent, or any material containing such photochemically reactive solvent, unless said discharge has been reduced by at least 85 percent. Emissions of organic materials into the atmosphere resulting from air or heated-drying of products for the first 12 hours after their removal from any article, machine, or other contrivance described in this Section shall be included in determining compliance with this paragraph. Emissions resulting from baking, heat-curing, or heat-polymerizing as described in IV.B of this rule shall be excluded from determination of compliance with this Section. Those portions of any series of articles, machines, equipment, or other contrivances designed for processing a continuous web, strip, or wire that emit organic materials in the course of using operations described in this Section shall be collectively subject to compliance with this Section.

D. Non-photochemically Reactive Solvents: A person shall not, discharge into the atmosphere more than 3,000 pounds of organic materials in any 1 day from any article, machine, equipment, or other contrivance in which any non-photochemically reactive organic solvent or any material containing such a solvent is employed or applied, unless said discharge has been reduced by at least 85 percent. Emissions or organic materials into the atmosphere resulting from air or heated-drying of products for the first 12 hours after their removal from any article, machine, equipment, or other contrivance described in this Section shall be included in determining compliance with this Section. Emissions resulting from baking, heat-curing, or heatpolymerizing as described in IV.B of this rule, shall be excluded from determination of compliance with this Section. Those portions of any series of articles, machines, equipment, or other contrivances designed for processing a continuous web, strip, or wire that emit organic materials in the course of using operations described in this Section shall be collectively subject to compliance with this Section.

E. Cleanup: Emissions of organic materials to the atmosphere from the cleanup with photochemically reactive solvent, from any article, machine, equipment or other contrivance described in IV.B, IV.C, and IV.D ., shall be included with the other emissions of organic materials from that article, machine, equipment or other contrivance for determining compliance with this Rule.

F. On and after XX XX, 2023, from all VOC-containing materials, equipment, and processes subject to this rule, an operator shall not emit to the atmosphere VOCs in excess of 833 pounds VOC per calendar month per facility.

1. Compliance with provisions above may be obtained through use of any of the following or any combination thereof:
    1. Product reformulation or substitution;
    2. Process changes;
    3. Improvement of operation efficiency;
    4. Development of innovative technology;

G. Contingency Provision: Notwithstanding Section IV.F, on and after sixty days following the effective date of EPA final determination that one or both of the conditions described in Clean Air Act Sections 172(c)(9) or 182(c)(9) have occurred in Eastern Kern County regarding the 2008 or 2015 8-hour Ozone National Ambient Air Quality Standard, an operator shall not emit to the atmosphere VOCs in excess of 450 pounds VOC per calendar month per facility from all VOC-containing materials, equipment, and processes subject to this rule.

H. In lieu of meeting the VOC emission limit in Section IV.F and IV.G, an operator may install and operate a VOC emission control system that meets the following requirements.

1. The VOC emission control system shall be approved by the APCO.
2. The VOC emission control system shall have a capture efficiency of at least 90 percent by weight (90 wt%) and a control efficiency of at least 95 wt%.

I. Organic Solvent Storage, and Disposal Requirements

An operator shall store or dispose of fresh or spent solvents, including waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when filling or emptying, and disposed of in a manner to prevent evaporation of VOCs into the atmosphere at the facility.

V. Administrative Requirements

A. Recordkeeping

1. Until XX XX, 2023 the records shall identify the organic solvent used in all source operations and shall include the name of each organic solvent, any person using organic solvents or any materials containing organic solvents shall supply the Air Pollution Control Officer, upon request and in the manner and form prescribed by him, written evidence of the chemical composition, physical properties and amount consumed for each organic solvent used.

2. On and after XX XX, 2023, operators shall

    1. Materials List: An operator shall maintain and have available on site, a current list of materials in use which provides all of the data necessary to evaluate compliance including the following information as applicable:

        i Specific manufacturer's name of solvent-containing material, including solvents, catalysts, and thinners.

        ii VOC content of each solvent-containing material, as used, in g/l or lb/gal.

    2. Material Usage Records – An operator shall maintain usage records on a daily basis that include the following information:

        i Specific material.

        ii Volume of material used (gallons).

        iii Specific solvents, catalysts and thinners added to material.

        iv Volume of each solvent, catalyst and thinner (gallons) added.

        v When the material is a mixture of different materials that are blended by the operator, the mix ratio of the batch shall be recorded and the VOC content of the batch shall be calculated and recorded in order to determine compliance with the VOC emission limits.

3. VOC Emission Control System Records

   An operator using a VOC emission control system as a means of complying with this rule shall maintain daily records of key system operating parameters which will demonstrate continuous operation and compliance of the VOC emission control system during periods of emission-producing activities.

4. Records Retention

   Records required by this Rule shall be retained for a minimum of three years and made available to the APCO upon request.

VI. Test Methods

A. Determination of VOC Content

1. The VOC content of organic solvents shall be determined by using EPA Test Method 24 or 24A or by using the manufacturer's product formulation data and the formula in Section II.H.

2. Exempt halogenated VOCs shall be determined by using the CARB Test Method 432 or SCAQMD Test Method 303.

B. Determination of Overall Capture and Control Efficiency of VOC Emission Control Devices

1. The capture efficiency of a VOC emission control system's collection device(s) shall be determined according to EPA's "Guidelines for Determining Capture Efficiency," January 9, 1995 and 40 CFR 51, Appendix M, Test Methods 204-204F, as applicable, or any other method approved by EPA, ARB, and the APCO.

2. The control efficiency of the VOC emission control system's control device shall be determined by using EPA Methods 2, 2A, or 2D for measuring flow rates and EPA Method 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of the control device. EPA Method 18 or CARB Method 422 shall be used to determine the emissions of exempt compounds. The control efficiency of the VOC emission control system's control device shall be calculated by using the following equation:

   $CE_{CONTROL} = [1 – (VOC_{OUT} / VOC_{IN})] \times 100\%$

   Where:

$CE_{CONTROL}$	=	Control Efficiency, in percent.
VOC_{IN}	=	VOC content, in grams/liter, less exempt compounds and water, into the control device.
VOC_{OUT}	=	VOC content, in grams/liter, less exempt compounds and water, out of the control device.

3. For VOC emission control systems that consist of a single VOC emission collection device connected to a single VOC emission control device, the overall capture and control efficiency shall be calculated by using the following equation:

$CE_{CAPTURE\ \&\ CONTROL} = [CE_{CAPTURE} \times CE_{CONTROL}] / 100\ \%$

Where:

$CE_{CAPTURE\ \&\ CONTROL}$	=	Overall Capture and Control Efficiency, in percent.
$CE_{CAPTURE}$	=	Capture Efficiency of the collection device, in percent, as determined in Section IV.B.1.
$CE_{CONTROL}$	=	Control Efficiency of the control device, in percent, as determined in Section IV.B.2.

C. Determination of VOC Emissions

1. The emissions of VOCs, measured and calculated as carbon, shall be determined by using EPA Test Method 25, 25A, or 25B, as applicable. EPA Test Method 18 or CARB Method 422 shall be used to determine the emissions of exempt compounds.

2. Total VOC emissions per day shall be determined for each source operation by using the following equation:

$$E_{Total} = \left[\left(\sum_{i=1}^{k} L_i V_i \right) + \left(\sum_{m=1}^{n} L_m V_m \times (1 - CE/100\%) \right) \right] / 454$$

Where:

ETotal	=	Total VOC emissions, in pounds per day.
Li	=	Liters per day used of the “i”th organic solvent that is uncontrolled.
Vi	=	Grams of VOC per liter of material of the “i”th organic solvent that is uncontrolled.
Lm	=	Liters per day used of the “m”th organic solvent that is controlled.
Vm	=	Grams of VOC per liter of material of the “m”th organic solvent that is controlled.
CE	=	Overall capture and control efficiency of the control device, in percent, as determined in Section VI.B.3.

D. Multiple Methods of Determination

VOC emissions and overall capture and control efficiency determined to exceed any limits established by this rule through the use of any of the above-referenced test methods and equations shall constitute a violation of the rule.

APPENDIX B:

PROPOSED REVISION RULE 410

ORGANIC SOLVENTS

STRIKEOUT UNDERLINE

RULE 410 **Organic Solvents** - Adopted 4/18/72, Amended 12/17/74, 11/27/79, (*insert date of rule adoption*)

I. Applicability

The provisions of this rule shall apply to any source operation emitting Volatile Organic Compounds (VOC) from the use of organic solvents unless the source operation is exempted under Section III (Exemptions).

II. Definitions

A. APCO: as defined in Rule 102 (Definitions).

B. CARB: California Air Resources Board.

C. Baked: a process whereby the coated object is heated above ambient temperature to a temperature at or above 194°F for the purpose of curing or drying.

D. Dissolver: an organic solvent that is added to an adhesive, coating, or ink in order to melt or to liquefy solid particles.

E. EPA: United States Environmental Protection Agency.

F. Exempt Compounds: all organic compounds not classified as VOC, as listed in the definition of VOC in Rule 102 (Definitions).

G. Facility: the same as 'Stationary Source" as defined in Rule 210.1

H. Grams of VOC per liter of Material: the weight of VOC per volume of material and is calculated by the following equation:

$$\text{Grams of VOC per liter of material} = \frac{Ws - Ww - Wec}{Vm}$$

Where:

Ws	=	Weight of volatile compounds, in grams
Ww	=	Weight of water, in grams
Wec	=	Weight of exempt compounds, in grams
Vm	=	Volume of material, in liters.

I. Heat-Cured or Heat-Polymerized: heated to a temperature less than or equal to 194^{o}F for the purpose of curing a coating, ink or adhesive.

J. Organic Solvent: the same as "Solvent."

K. Photochemically Reactive Solvent: any organic solvent with an aggregate of more than 20% of its total volume composed of chemical compounds classified below or which exceeds any of the following individual percentage composition limitations referring to the total volume of solvent:

1. A combination of hydrocarbons, alcohols, aldehydes, esters, ethers or ketones having an olefinic or cycloolefinic type of unsaturation: five (5) percent; or

2. A combination of aromatic compounds with eight (8) or more carbon atoms to the molecule except ethylbenzene: eight (8) percent; or

3. A combination of ethylbenzene, ketones having branched hydrocarbon structures, or toluene: 20%.

Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one (1) of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percentage of the total volume of solvents.

L. SCAQMD: South Coast Air Quality Management District.

M. Solvent: any liquid containing an organic compound or combination of organic compounds used as diluent, thinner, dissolver, viscosity reducer, cleaning agent, or other similar uses. These liquids are principally derived from petroleum and include petroleum distillates, chlorinated hydrocarbons, chlorofluorocarbons, ketones, and alcohols. Solutions, emulsions, and dispersions of water and soap, or water and detergent, are not considered organic solvents. Soaps and detergents are considered water based surfactants.

N. Standard Conditions: as defined in Rule 102 (Definitions).

O. Thinner or Viscosity Reducer: an organic solvent which is used to dilute coatings to reduce viscosity, color strength, and solids, or to modify drying conditions.

~~1.~~P. Volatile Organic Compound (VOC): The definitions contained in 40 CFR 51.100 shall apply, and are hereby incorporated by reference. In the event of any discrepancy between a definition contained in 40 CFR 51.100 and any definition specified above, the definition specified above shall control.

III. Exemptions

The provisions of this Rule shall not apply to:

A. The manufacture of organic solvents, or the transport or storage of organic solvents or materials containing organic solvents.

~~A.~~

~~B. The use of equipment for which other requirements are specified by Rules 411, 412, 413, and 414, or which are exempt from air pollution control requirements by said Rules.~~

B. Provisions of this rule do not apply to coatings, coating removers (strippers), surface preparation material, and cleanup material specifically subject to the requirements of the following District rules:

1. 410.1A, Architectural Coating Controls;

2. 410.3, Organic Solvent Degreasing Operation;
3. 410.4, Metal, Plastic, and Pleasure Craft Parts and Products Coating Operations,
4. 410.4A, Motor Vehicle and Mobile Equipment Refinishing Operations,
5. 410.7, Graphic Arts;
6. 410.8, Aerospace Assembly and Coating Operations;
7. 410.9, Wood Products Surface Coating Operations;
8. 432, Polyester Resin.

~~1.~~C. The spraying or other employment of insecticides, pesticides or herbicides.

~~2.~~D. The employment, application, evaporation or drying of saturated halogenated hydrocarbons or perchloroethylene.

~~3.~~E. The use of any material, in any article, machine, equipment or other contrivance described in Sections ~~I., II., III., or~~ IV.B, IV.C, and IV.D ~~,~~ if:

1. the volatile content of the material consists only of water and organic solvents, and

2. the organic solvents content comprises not more than 20% by volume of the total volatile content, and

3. the volatile content is not photochemically reactive, and

~~4.~~ the organic solvent does not come into contact with flame.

~~4. The use of any material in any article, machine, equipment or other contrivance described in Sections I., II., III., or IV. if:~~

~~5. until January 1, 1977, the organic solvent content of a material does not exceed 30% by volume of said material after January 1, 1977, the organic solvent content of such material shall not exceed 20% by volume, and~~

~~6. the volatile content is not photochemically reactive, and~~

~~7. the organic solvent content does not come into contact with flame.~~

~~5. The use of equipment or surface coating material for which other requirements are specified by these Rules and Regulations.~~

4.

IV. Requirements

A. Sections IV.B through IV.E shall remain in effect until XX XX, 2023.

B. Solvents Subjected to Heat: A person shall not discharge into the atmosphere more than 15 pounds or organic materials in any 1 day from any article, machine, equipment, or other contrivance in which any organic solvent or any material containing organic solvent comes into contact with flame or is baked, heat-cured, or heat-polymerized in the presence of oxygen, unless said discharge has been reduced by a least 85 percent. These portions of any series of articles, machines, equipment,

or other contrivances designed for processing continuous web, strip, or wire that emit organic materials in the course of using operations described in this Section shall be collectively subject to compliance with this Section.

~~II.~~

C. Photochemically Reactive Solvents: A person shall not discharge into the atmosphere more than 40 pounds of organic materials in any 1 day from any article, machine, equipment or other contrivance used under conditions other than those described in ~~Paragraph I~~IV.B~~. of this Section~~ for employing or applying any photochemically reactive solvent, ~~as defined in Paragraph X. of this Section,~~ or any material containing such photochemically reactive solvent, unless said discharge has been reduced by at least 85 percent. Emissions of organic materials into the atmosphere resulting from air or heated-drying of products for the first 12 hours after their removal from any article, machine, or other contrivance described in this Section shall be included in determining compliance with this paragraph. Emissions resulting from baking, heat-curing, or heat-polymerizing as described in IV.B~~Paragraph I.~~ of this ~~Section~~ rule shall be excluded from determination of compliance with this Section. Those portions of any series of articles, machines, equipment, or other contrivances designed for processing a continuous web, strip, or wire that emit organic materials in the course of using operations described in this Section shall be collectively subject to compliance with this Section.

~~III.~~

D. Non-photochemically Reactive Solvents: A person shall not, ~~after August 31, 1986,~~ discharge into the atmosphere more than 3,000 pounds of organic materials in any 1 day from any article, machine, equipment, or other contrivance in which any non-photochemically reactive organic solvent or any material containing such a solvent is employed or applied, unless said discharge has been reduced by at least 85 percent. Emissions or organic materials into the atmosphere resulting from air or heated-drying of products for the first 12 hours after their removal from any article, machine, equipment, or other contrivance described in this Section shall be included in determining compliance with this Section. Emissions resulting from baking, heat-curing, or heatpolymerizing as described in IV.B~~Paragraph I.~~ of this ~~Section~~ rule, shall be excluded from determination of compliance with this Section. Those portions of any series of articles, machines, equipment, or other contrivances designed for processing a continuous web, strip, or wire that emit organic materials in the course of using operations described in this Section shall be collectively subject to compliance with this Section.

~~IV.~~

E. Cleanup: Emissions of organic materials to the atmosphere from the cleanup with photochemically reactive solvent, from ~~as defined in Section X., of~~ any article, machine, equipment or other contrivance described in IV.B, IV.C, and IV.D ~~Sections I., II., or III.~~, shall be included with the other emissions ~~of~~ of organic materials from that article, machine, equipment or other contrivance for determining compliance with this Rule.

F. On and after XX XX, 2023, from all VOC-containing materials, equipment, and processes subject to this rule, an operator shall not emit to the atmosphere VOCs in excess of 833 pounds VOC per calendar month per facility.

1. Compliance with provisions above may be obtained through use of any of the following or any combination thereof:
   a. Product reformulation or substitution;
   b. Process changes;
   c. Improvement of operation efficiency;
   d. Development of innovative technology;

G. Contingency Provision: Notwithstanding Section IV.F, on and after sixty days following the effective date of EPA final determination that one or both of the conditions described in Clean Air Act Sections 172(c)(9) or 182(c)(9) have occurred in Eastern Kern County regarding the 2008 or 2015 8-hour Ozone National Ambient Air Quality Standard, an operator shall not emit to the atmosphere VOCs in excess of 450 pounds VOC per calendar month per facility from all VOC-containing materials, equipment, and processes subject to this rule.

H. In lieu of meeting the VOC emission limit in Section IV.F and IV.G, an operator may install and operate a VOC emission control system that meets the following requirements.

1. The VOC emission control system shall be approved by the APCO.

2. The VOC emission control system shall have a capture efficiency of at least 90 percent by weight (90 wt%) and a control efficiency of at least 95 wt%.

I. Organic Solvent Storage, and Disposal Requirements

An operator shall store or dispose of fresh or spent solvents, including waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when filling or emptying, and disposed of in a manner to prevent evaporation of VOCs into the atmosphere at the facility.

~~V.~~

V. Administrative Requirements

A. Recordkeeping

1. Until XX XX, 2023 the records shall identify the organic solvent used in all source operations and shall include the name of each organic solvent, any person using organic solvents or any materials containing organic solvents shall supply the Air Pollution Control Officer, upon request and in the manner and form prescribed by him, written evidence of the chemical composition, physical properties and amount consumed for each organic solvent used.

2. On and after XX XX, 2023, operators shall

   a. Materials List: An operator shall maintain and have available on site, a current list of materials in use which provides all of the data necessary to evaluate compliance including the following information as applicable:

i Specific manufacturer's name of solvent-containing material, including solvents, catalysts, and thinners.

ii VOC content of each solvent-containing material, as used, in g/l or lb/gal.

b. Material Usage Records – An operator shall maintain usage records on a daily basis that include the following information:

i Specific material.

ii Volume of material used (gallons).

iii Specific solvents, catalysts and thinners added to material.

iv Volume of each solvent, catalyst and thinner (gallons) added.

v When the material is a mixture of different materials that are blended by the operator, the mix ratio of the batch shall be recorded and the VOC content of the batch shall be calculated and recorded in order to determine compliance with the VOC emission limits.

3. VOC Emission Control System Records

An operator using a VOC emission control system as a means of complying with this rule shall maintain daily records of key system operating parameters which will demonstrate continuous operation and compliance of the VOC emission control system during periods of emission-producing activities.

4. Records Retention

Records required by this Rule shall be retained for a minimum of three years and made available to the APCO upon request.

VI. Test Methods

~~1. Any person using organic solvents or any materials containing organic solvents shall supply the Air Pollution Control Officer, upon request and in the manner and form prescribed by him, written evidence of the chemical composition, physical properties and amount consumed for each organic solvent used.~~

A. Determination of VOC Content

1. The VOC content of organic solvents shall be determined by using EPA Test Method 24 or 24A or by using the manufacturer's product formulation data and the formula in Section II.H.
2. Exempt halogenated VOCs shall be determined by using the CARB Test Method 432 or SCAQMD Test Method 303.

B. Determination of Overall Capture and Control Efficiency of VOC Emission Control Devices

1. The capture efficiency of a VOC emission control system's collection device(s) shall be determined according to EPA's "Guidelines for Determining Capture Efficiency," January 9, 1995 and 40 CFR 51, Appendix M, Test Methods 204-204F, as applicable, or any other method approved by EPA, ARB, and the APCO.

2. The control efficiency of the VOC emission control system's control device shall be determined by using EPA Methods 2, 2A, or 2D for measuring flow rates and EPA Method 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of the control device. EPA Method 18 or CARB Method 422 shall be used to determine the emissions of exempt compounds. The control efficiency of the VOC emission control system's control device shall be calculated by using the following equation:

$$CE_{CONTROL} = [1 - (VOC_{OUT} / VOC_{IN})] \times 100\%$$

Where:

$CE_{CONTROL}$ = Control Efficiency, in percent

VOC_{IN} = VOC content, in grams/liter, less exempt compounds and water, into the control device

VOC_{OUT} = VOC content, in grams/liter, less exempt compounds and water, out of the control device.

3. For VOC emission control systems that consist of a single VOC emission collection device connected to a single VOC emission control device, the overall capture and control efficiency shall be calculated by using the following equation:

$$CE_{CAPTURE\ \&\ CONTROL} = [CE_{CAPTURE} \times CE_{CONTROL}] / 100\ \%$$

Where:

$CE_{CAPTURE\ \&\ CONTROL}$ = Overall Capture and Control Efficiency, in percent

$CE_{CAPTURE}$ = Capture Efficiency of the collection device, in percent, as determined in Section IV.B.1.

$CE_{CONTROL}$ = Control Efficiency of the control device, in percent, as determined in Section IV.B.2.

C. Determination of VOC Emissions

1. The emissions of VOCs, measured and calculated as carbon, shall be determined by using EPA Test Method 25, 25A, or 25B, as applicable. EPA Test Method 18 or CARB Method 422 shall be used to determine the emissions of exempt compounds.

2. Total VOC emissions per day shall be determined for each source operation by using the following equation:

$$E_{Total} = \left[\left(\sum_{i=1}^{k} L_i V_i \right) + \left(\sum_{m=1}^{n} L_m V_m \times (1 - CE/100\%) \right) \right] / 454$$

Where:

ETotal	=	Total VOC emissions, in pounds per day
Li	=	Liters per day used of the "i"th organic solvent that is uncontrolled
Vi	=	Grams of VOC per liter of material of the "i"th organic solvent that is uncontrolled
Lm	=	Liters per day used of the "m"th organic solvent that is controlled
Vm	=	Grams of VOC per liter of material of the "m"th organic solvent that is controlled
CE	=	Overall capture and control efficiency of the control device, in percent, as determined in Section VI.B.3.

D. Multiple Methods of Determination

VOC emissions and overall capture and control efficiency determined to exceed any limits established by this rule through the use of any of the above-referenced test methods and equations shall constitute a violation of the rule.

Reminder of this page intentionally left blank.

~~**VI.** Emissions of organic materials into the atmosphere required to be controlled by Sections I., II., or III., shall be reduced by:~~

~~A. Incineration, provided that 90 percent or more of the carbon in the organic material being incinerated is oxidized to carbon dioxide, or~~

~~B. Absorption, or~~

~~C. Processing in a manner determined by the Air Pollution Control Officer to be not less effective than A. or B. above~~

~~**VII.** A person incinerating, absorbing, or otherwise processing organic materials pursuant to this~~

~~Rule shall provide, properly install and maintain in calibration, in good working order and in operation, devices as specified in the Authority to Construct or the Permit to Operate, or as specified by the Air Pollution Control Officer, for indicating temperatures, pressures, rates of flow or other operating conditions necessary to determine the degree and effectiveness of air pollution control.~~

~~**VIII.** For the purpose of this Rule, organic solvents include diluents and thinners and are defined as organic materials which are liquids at standard conditions and which are used as dissolvers, viscosity reducers or cleaning agents, except that such materials exhibiting a boiling point higher than 220/F at 0.5 millimeter mercury absolute pressure or having an equivalent vapor pressure shall not be considered to be solvents unless exposed to temperatures exceeding 220/F.~~

~~**IX.** For the purposes of this Rule, a photochemically reactive solvent is any solvent with an aggregate of more than 20 percent of its total volume composed of chemical compounds classified below or which exceeds any of the following individual percentage composition limitations, referred to the total volume of solvent:~~

~~A. A combination of hydrocarbons, alcohols, aldehydes, esters, ethers or ketones having an olefinic or cycloolefinic type of unsaturation: 5 percent;~~

~~B. A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent;~~

~~C. A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene: 20 percent.~~

~~Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group; that is, that group having the least allowable percentage of the total volume of solvents.~~

~~**X.** For the purpose of this Rule, organic materials are defined as chemical compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates and ammonium carbonate.~~

APPENDIX C

PROPOSED REVISION RULE 410

ORGANIC SOLVENTS

EMISSION REDUCTION ANALYSIS

I. Introduction

This appendix identifies the estimated volatile organic compounds (VOC) emission reductions for draft amendments to Rule 410 (Organic Solvents). These estimates are based on the best available information at the time that this report was written.

A. The District's 2012 inventory is used for baseline planning and for Reasonable Further Progress (RFP). On July 17, 2014, CARB submitted the 2012 base year emissions inventory for all California non-attainment areas to EPA. The 2012 base year emissions inventory is used for all growth scenarios in this Attainment Plan. In 2014, ARB established 2012 as the emission inventory base year for 8-hour ozone planning purposes. The 2012 emission inventory at the District for permits subject to Rule 410 was 0.54 tons per day (tpd) of VOC emissions. There were approximately 8 permitted facilities utilizing organic solvents in 2012.

Table 1 summarizes the estimated emission reductions from Rule amendments. The calculation methodology is outlined in Section II of this appendix. Overall, the proposed amendments are estimated to have a total of about 0.18 tons per day of VOC emission reductions, which is about a 34% reduction to the adjusted 2012 baseline VOC emissions.

Table 1-Estimated Emission Reduction

Category	2012 Baseline VOC Emissions (tpd)	Estimated Reduction (%)	Estimated VOC Emission Reductions (tpd)
Rule 410 –Lower VOC Emission Limit	0.54	34%	0.183

II. Emission Reduction Analysis

Operators in many different types of industries perform solvent cleaning and solvent degreasing. Under current rule provisions, a daily VOC emission limit is listed for cleaning materials and the allowable content limit depends on the particular cleaning operation.

A. VOC Emission Inventory for 2012

Emission inventory codes (EIC) describe the source category and consist of a 14-digit code. The first three digits generally represent a general emission group; the second three digits are representing a specific operation, followed by four digits for listing the material. The final four digits are used only for certain categories, are specific to the individual air district, and represent even more refined information about the emission source. For this rule project, District staff reviewed all of the EICs assigned to the District to determine which apply to solvent cleaning or solvent degreasing. District staff tracks certain cleaning categories using organic compounds that are exempt from being counted as VOCs. One example of this is EIC 230-240-3800-0000, which is for the use of

acetone during cleaning and thinning in the industry “coatings and other related processes.” The emission inventory for exempt compound EICs was set to zero. Within the inventory, there are some EICs that apply to both thinning and cleaning or to both thinning and coatings. Initial VOC emission inventory for solvent cleaning and degreasing is estimated to be 0.54 tons VOC per day, using 2012 emissions data from the District’s 8-hour Ozone Plan and published by the California Air Resources Board.

B. VOC Emission Reductions

1. General Cleaning

Emission reductions are the difference between the current emissions claimed for this rule project minus the emissions after rule implementation.

Emission Reduction = Current Emissions - Emissions after Implementation

For purposes of this emission reduction analysis District staff is making the following assumptions:

- When an operator uses emission control systems to comply with rule requirements, the total VOC emissions reported on the permit are from the system exhaust.

The estimated VOC emission reductions (ER) due to rule amendment to miscellaneous solvents VOC limits was calculated using the following equation:

$$ER = \left(\frac{\text{Current VOC limit - Proposed VOC limit}}{\text{Current VOC limit}} \right) \times (Emissions)$$

If contingency measures are triggered, this rule project would change the allowable VOC emission limit for general cleaning and surface preparation from 40 pounds per day to 15 pounds per day. This represents a 62.5% reduction in the VOC emission limit. For all emission inventory categories associated with solvent cleaning, a factor of 34% was applied (based on average facility solvent usage) to the current emission inventory to get the estimated emission reductions. The rule amendments will reduce most solvent cleaning categories by a total of about 0.182 tons VOC per day, as shown in Table 2.

Remainder of Page Intentionally Left Blank

Table 2-EICs and VOC Emission Calculations for General Cleaning, non-printing, non-architectural process

EIC	VOC	2012 Emissions (tpd)	Estimated VOC Emission Reductions (tpd)
220-204-0500-0000	Y	0.51	0.173
220-204-3022-0000	Y	0.00	0.00
220-204-3083-0000	N	0.00	0.00
220-204-3204-0000	Y	0.00	0.00
220-204-3333-0000	Y	0.00	0.00
220-204-8106-0000	Y	0.01	0.003
220-206-3083-0000	N	0.00	0.00
220-206-3344-0000	N	0.00	0.00
220-208-0500-0000	Y	0.01	0.003
220-208-3022-0000	Y	0.00	0.00
220-208-3176-0000	Y	0.00	0.00
220-208-3204-0000	Y	0.01	0.003
220-208-3339-0000	Y	0.00	0.00
220-208-8104-0000	Y	0.00	0.00
Total Emissions		**0.54**	**0.182**

Remainder of Page Intentionally Left Blank

APPENDIX D

PROPOSED REVISION RULE 410

ORGANIC SOLVENTS

COST EFFECTIVENESS ANALYSIS

I. INTRODUCTION

The California Health and Safety Code 40920.6(a) requires the Eastern Kern Air Pollution Control District (District) to conduct both an "absolute" cost effectiveness analysis and an “incremental” cost effectiveness analysis of available emission control options prior to adopting a Best Available Retrofit Control Technology (BARCT) rule. The purpose of conducting a cost effectiveness analysis is to evaluate the economic reasonableness of the pollution control measure or rule. The analysis also serves as a guideline in developing the control requirements of a rule. Incremental cost effectiveness is intended to measure the change in costs (in $/year) and emissions reductions (in tons reduce/year) between two progressively more effective control options or technologies.

Absolute cost effectiveness of a control option is the added annual cost, in dollars per year ($/yr), of a control technology or technique, divided by the emission reduction achieved, in tons reduced per year. The costs include capital equipment costs, engineering design costs, labor and maintenance costs. Incremental cost effectiveness is intended to measure the change in costs, in $/yr, and change in emissions reductions in tons reduced/year between two progressively more effective control options or technologies. The incremental cost effectiveness compares the differences in costs and the differences in emissions reductions of candidate control options. Incremental cost effectiveness does not reveal the emission reduction potential of the control options. Unlike the absolute cost effectiveness analysis that identifies the control option with the greatest emission reduction, incremental cost effectiveness does not present any correlation between emissions reductions and cost effectiveness. Therefore, the relative values produced in the incremental cost effectiveness analysis and the absolute cost effectiveness values are not comparable and cannot be evaluated similarly.

District staff used available cost information contained in technical reports, searched EPA's Control Techniques Guidelines (CTG), distributers, and staff reports from other Air Districts to conduct a cost effectiveness analysis of the proposed requirements of Rule 410. Table 1 shows the total estimated costs and cost effectiveness for the proposed changes to Rule 410.

Table 1-Summary of Costs and Cost Effectiveness

	Net Annual Cost ($/yr)		Cost Effectiveness ($/ton VOC reduced)	
	Low End	High End	Low End	High End
Lower Facility VOC emission limit	$100,113	$1,132,533	$1,499	$16,957

II. COST EFFECTIVENESS ANALYSIS

A. Background

Typically, VOC emission control systems utilize a regenerative thermal oxidizer (RTO) or carbon adsorption system as the VOC destruction device. A single RTO costs hundreds of thousands of dollars to buy and install and tens of thousands of dollars to operate each year. It is believed that operators will comply with the VOC emission limits proposed by this rule project by reformulating, diluting, or improving usage efficiency of the current cleaning solvents, since it would be more economical to change solvents rather than install capital equipment like a RTO to meet rule requirements.

The first category is the changes is to reduce the allowed VOC emission limit from 40 pounds per day to 27 pounds per day or 833 pounds per year per facility. The second category of changes which is only applicable upon the District failing to attain the 2008 Ozone National Ambient Air Quality Standard. An operator shall not emit to the atmosphere VOCs in excess of 15 pounds per day or 450 pounds per month. Operators are expected to reduce the VOC content of the currently used material by thinning it with additional water or other exempt solvent (e.g., acetone or methyl acetate).

B. Cost Calculations

In 2007, based on the SCAQMD staff report, high-VOC solvent cleaner averaged $5 per gallon. The low-VOC cleaner ranged in price from $6 to $21 per gallon. Operators are assumed to already be using the high-VOC material, so the difference between the low-VOC and the high-VOC cleaners multiplied by the estimated annual cleaning material solvent would be the cost to operations from the proposed rule amendments. District assumes all high-VOC solvent consist of petroleum naphtha with a VOC content of 6.3 lbs/gal. This means that the cost of compliance for reducing application VOC emissions is estimated between $1 and $16 per gallon. Current estimated usage of high-VOC solvent is about 62,500 gallons per year. Acetone is an exempt compound that has some solvent properties, but also is more volatile than many of the solvents it would replace. District staff assumed that 10% more acetone/methyl acetate would be used to compensate for additional evaporation compared to current solvent usage or about 68,800 gallons per year of low-VOC material. By subtracting the current annual cost of high-VOC solvent cleaning material from the projected low-VOC cleaning material cost, estimated annual compliance cost would range from $100,000 and $1.1 million.

Table 1-Annual Cost for Complying with Reduced VOC Emission Limits by Solvent Substitution

	Annual Usage (gallons/year)	Cost per gallon	Annual Cost ($/yr)	Net cost increase ($/yr)
Current High-VOC Solvent Usage	62,571	5$	$312,855	--
Low VOC-replacement low-cost option	68,828	6$	$412,968	$100,113
High VOC-replacement high-cost solvent option	68,828	21$	$1,445,388	$1,132,533

Annual Cost for Complying with Reduced VOC Emission Limits via Solvent Dilution

The difference in cost between the current compliant cleaning solvent and the proposed cleaning solvent is zero, since the operator could use water to dilute the current cleaning solvent to meet the lower VOC content limit.

C. Absolute Cost Effectiveness Analysis

The absolute cost effectiveness is the added cost of implementing the proposed
amendments divided by the estimated emission reductions. As outlined above, the area where VOC emission reductions are expected is from the lower annual facility-wide VOC emission limits.

Table 2 below summarizes the costs and cost effectiveness for each of these changes. For amendments to Rule 410, the range in cost effectiveness is about $1,500 to $17,000 per ton VOC removed.

Cost effectiveness is calculated as follows:
Emission reduction from Appendix C: 66.79 ton VOC/yr
Cost Effectiveness= Net annual cost/ 66.79 tons VOC/yr

Table 2: Costs and Cost Effectiveness Analysis

	Net Annual Cost ($/yr)		Estimated VOC Emission Reductions (tpy)	Cost Effectiveness ($/ton VOC reduced)	
	Low End	High End		Low End	High End
Lower Facility VOC emission limit	$100,113	$1,132,533	66.79	$1,499	$16,957

D. Incremental Cost Effectiveness Analysis

Incremental cost effectiveness is intended to measure the change in costs, in $/yr, and change in emissions reductions in tons reduced/year between two progressively more effective control options or technologies. For this rule project, the limits are considered the lowest achieved in practice. Additionally, solvent cleaning for this application is expected to be non-point and intermittent in nature which pose additional challenges for installing VOC control system e.g. thermal oxidizer. Installing VOC control equipment has not been analyzed at this point of rule development process as operators are expected to comply primarily via solvent substitution, dilution methods. This means that there are no additional VOC emission reductions to be realized at this time. Therefore, no incremental cost effectiveness analysis was conducted.

Remainder of Page Intentionally Left Blank

APPENDIX E

PROPOSED REVISION RULE 410

ORGANIC SOLVENTS

RULE CONSISTANCT ANALYSIS

I. Background

Pursuant to Section 40727.2 of the California Health and Safety Code, prior to adopting, amending, or repealing a rule or regulation, the District is required to perform a written analysis that identifies and compares the air pollution control elements of the rule or regulation with corresponding elements of existing or proposed District and United States Environmental Protection Agency (EPA) rules, regulations, and guidelines that apply to the same source category. The elements analyzed are emission standards,
monitoring and testing, and recordkeeping and reporting requirements. The analysis is detailed in Section II of this report. Conclusions based on the analysis are shown in Section III.

II. Rule Consistency Analysis

Facilities subject to District Rule 410 could be subject to other District Rules including:

- Rule 210.1 New and Modified Stationary Source Review
- Rule 422 New Source Performance Standards
- Rule 423 National Emissions Standards for Hazardous Air Pollutants
- Rule 401 Visible Emissions
- Rule 419 Nuisance

After review, the District determined the above-listed Rules are not in conflict with, nor are they inconsistent with the requirements of proposed Rule 410.

District staff reviewed EPA rules, regulations, and guidelines, as well as District rules for the source categories covered by the eleven District rules in this rule project. The analysis was confined to those provisions that refer to organic solvent usage for miscellaneous source categories. Emission limits, operating parameters, monitoring, testing, records, and reporting requirements from processes other than solvent usage associated with the source category were ignored for purposes of the rule consistency analysis.

A. Existing or Proposed Federal Rules, Regulations, and Guidelines

1. Control Techniques Guidelines (CTGs)

There are two CTGs that have solvent cleaning provisions. These applicable CTG are listed in Table 1.

Table 1-CTGs with Solvent Provisions

CTG Number/ Title	Operation Covered
EPA-450/2-77-022 Control of Volatile Organic Emissions from Solvent Metal Cleaning	Facilities that use a degreaser to clean
EPA-453/R-06-001 Control Techniques for Industrial Cleaning Solvents	Cleaning with solvent in industrial settings

The CTG for solvent metal cleaning relates to degreasers. Rule 410.3 addresses these units. Because this CTG was approved in 1977, all of the requirements related to solvent degreasers have been incorporated into Rule 410.3 by previous rule projects.

The CTG for cleaning in industrial settings recommends a general VOC content limit of 50 g/L with some exceptions, mostly for cleaning of printing equipment. Cleaning requirements including the 50 g/L limits have previously been incorporated into source specific coating Rule projects.
These Rule projects incorporates a VOC content of 25 g/L for most cleaning operations, which is lower than the CTG-recommended content limit of 50 g/L. Hence, the proposed amendments to Rule 410 would not conflict with federal CTGs.

2. New Performance Standards (NSPS)

NSPS requirements are organized by source category in 40 CFR Part 60. The District has incorporated the NSPS by reference, meaning that District Rule 422 lists all of the NSPSs and the requirements of these NSPSs have been adopted by reference. District Rule 422 lists delegated NSPSs. None of these NSPSs have solvent cleaning as part of its requirements. Therefore, this rule project is neither inconsistent with nor conflicts with any requirement of an NSPS.

3. National Emission Standards for Hazardous Air Pollutants (NESHAPs)

NESHAPs are requirements contained in 40 CFR 61 and 40 CFR 63. As with the NSPSs, the District has incorporated the requirements of the NESHAPS into its rules and District Rule 423. There are no NESHAPs in 40 CFR 61 with solvent cleaning requirements. Table 2 lists the NESHAPs from 40 CFR 63 with solvent cleaning provisions. Of the NESHAPs in Table 2, 40 CFR 63 Subpart T applies to District Rule 410.3 for solvent degreasers. The District rules that apply to the source categories for the remaining NESHAPs are subject to solvent cleaning requirements under the following source specific rules: 410.8, Aerospace Assembly and Coating Operations, 410.4, Metal, Plastic, and Pleasure Craft Parts and Products Coating Operations.

Table 2- NESHAPs with Solvent Cleaning Provisions

40 CFR 63 Subpart:	Source Category
T	Halogenated Solvent Cleaning
GG	Aerospace Manufacturing and Rework
WW	Boat Manufacturing - Resin and Gel Coat Application Equipment Cleaning Operations
III	Flexible Polyurethane Foam Production

In complying with the District rules for the above source categories, there is no conflict with NESHAP.

III. RESULTS OF RULE CONSISTENCY ANALYSIS

District staff found that facilities could comply with the proposed amendments to organic solvents Rule as well as all other existing or proposed District rules. Based on the above analysis, District staff found that the proposed amendments to Rule 410 would not conflict with federal rules, regulations, or policies covering similar stationary sources.

Remainder of Page Intentionally Left Blank