

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

**FINAL STAFF REPORT FOR PROPOSED AMENDED RULE 1125 – METAL
CONTAINER, CLOSURE, AND COIL COATING OPERATIONS**

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EXECUTIVE SUMMARY

Rule 1125 - Metal Container, Closure, and Coil Coating Operations currently limits the VOC content of inks used to 300 grams per liter, less water and less exempt compounds. Staff has determined that this limit is not technologically feasible for high speed coding and marking inkjet operations because of their low solids, low viscosity, and rapid dry requirements. Therefore, staff is recommending the establishment of two categories for inkjet inks, those used in continuous inkjet and inkdot printers with visible inks, and those that are visible under ultra violet light exposure or when exposed to heat. An additional category is also recommended for inkjet make-up solvents used in continuous inkjet printers, for reasons of technical limitations in formulating these types of inks and accompanying make-up solvents at the current volatile organic compound (VOC) limit. This action will result in 3 pounds of excess VOC reductions foregone compared to the limit that exists today.

In addition, as part of a review of reasonably available control measures (RACM) for this industry, staff is also recommending to lower the VOC content limit for end sealing compounds for food and beverage cans, as an achieved in practice standard, to 20 grams of VOC per liter, less water and less exempt compounds from 440 grams per liter, which is the current VOC limit stated in Rule 1125. Overall, there will be a State Implementation Plan (SIP) creditable emissions reduction of 0.31 tons of VOC per day as a result of reducing the VOC limit for end sealing compounds from food and beverage application and allowing the establishment of inkjet categories. The existing limit for non-food end sealing compounds will remain at zero grams per liter of VOC.

BACKGROUND

Rule 1125 – Metal Container, Closure, and Coil Coating Operations was adopted April 6, 1979. The rule has subsequently been amended ten times, the last being January 13, 1995. Rule 1125 was part of a 10-rule technology assessment in 1996 and was evaluated for future emission reductions in a technical assessment in May of 2005, as required by the 2003 AQMP control measure CTS-10, Miscellaneous Industrial Coatings and Solvent Operations. This examination of the current status of the three operations covered by Rule 1125 (metal container, closure, and coil coating operations), and the current and developing technology associated with, them led staff to conclude that no rulemaking for Rule 1125 should be initiated at that time, but did suggest that inkjet printing, a process used to mark two and three piece cans with printed codes or colored single dots of ink, as can line identifiers, was inadequately addressed within the rule.

There are two companies within the South Coast Air Basin that use high speed array inkjet printing operations (continuous inkjet) to manufacture three piece hand-held aerosol and dog food cans, and the other manufactures food cans. Two more companies use single dot (or ink-dot) systems to identify specific aluminum beverage can manufacturing lines for tracking purposes.

TECHNOLOGY ASSESSMENT

High Speed Coding and Marking Inkjet Technology

High speed coding and marking inkjet printing describes digital dot-matrix printing technology whereby ink is broken up into picoliter-sized droplets through micro-sized nozzles and directed at a substrate with utmost precision. Since direct mechanical contact with the substrate does not occur, it is a non-impact printing technology. Inkjet printing, developed in the 1950s as a mechanism for chart recording, used analogue voltage signals. In the early 1960s, the introduction of pressure waves to a continuous supply or stream of ink and orifice further mechanized the control of ink droplet size and spacing.

Additional refinement occurred in the formation and placement of ink droplets achieved through use of selective electric charging of ink droplets, occurring at the natural break-up point of a continuous stream of ink (1970s). By switching the voltage on and off at this point, electric charges are applied to selected droplets. The charged droplets are further charged to higher voltages immediately downstream to deflect them in flight into a recovery gutter for recirculation back to the reservoir while the uncharged droplets hit their target. The opposite scenario is also used (deflected ink particles hit the target while the uncharged ink particles are recirculated). This method of printing, called continuous ink-jet printing (CIJ), forms the basis for high-speed marking, coding and labeling. Recirculated ink will lose much of its original solvent content due to evaporation, and therefore creates the need for substantial make-up solvent addition. This high speed printing technology is the backbone of high speed marking, due to its low viscosity (1-5 centipoise at 20° C), lower solids content (5 to 25 percent by weight), electrically conducting, and fast drying characteristics.

CIJ printing is characterized by single and array nozzle assemblies. Single continuous inkjet (sCIJ) printers use only one ink stream while array continuous printers (aCIJ) can use a hundred or more parallel streams per inch. The can industry uses CIJ printers with organic solvent-based chemistries. Although the technology can accommodate water-based inks as well, smudging concerns preclude its use as high speed lines dictate rapid drying. CIJ dot structures can be as high as 256 dots per inch (dpi), with firing rates of 1,000,000 times per second per nozzle (1 MHz), with most of the ink returning for recycling and make-up solvent addition. Although more typical operations are capable of printing 5 dot by 5 dot areas yielding a character with a maximum of 25 dots and they print on the order of 1800 characters per second at firing rates of 45,000 dots per second.

A second technology called an ink-dot identification system is also being used at two facilities, based on a ball-and-seat arrangement that is electrically triggered to release a single small volume of solvent-based ink on the bottom of the can at high production line speeds (3,000 to 5,000 cans per minute). Although not technically an inkjet operation because of the lack of array placement, it is still a non-impact printing technology.

Ink Technologies

The inks used for sCIJ and aCIJ printers in the can industry are solvent-borne inks in which resins are dissolved in solvent and the pigments are dispersed into the solution, or

in the case of dye inks, the colorants are fully dissolved by the solvent. Ink drying is by evaporation of the solvent, and the ink must dry within tenths of seconds to prevent smudging. They have specified properties such as low viscosity, high conductivity, and high volatility.

The requirement for low viscosity generally results in inks with low-solids content, typically no higher than 15 percent by weight and as little as 3 percent by weight. Without proper viscosity control the ink will not form individual droplets. In addition the ink must pass through a nozzle with a diameter of 20 to 120 microns, not only requiring low viscosity, but tiny diameter resin, pigment or colorant grind. The conductivity of the ink must also be controlled so that the droplets can be charged properly and the correct amount of deflection achieved. On a can line, the ink must be capable of drying to touch within fractions of seconds of application in an air-dry environment. These ink requirements preclude the use of waterborne ink chemistries.

In the past, companies have been using pure VOC solvent-based inks; however, there have been recent developments with the use of acetone in CIJ ink formulations (except thermochromic ink). Acetone meets the needs of the industry with regard to conductivity and volatility to a point. Since the formed stream of ink and subsequent droplets are so small, the evaporation rate must be slowed down to prevent clogging of the nozzle. This requires the addition of co-solvents on the order of 15 percent by weight in addition to acetone at nearly 70 percent by weight. The resulting VOC content, less exempt compound is approximately 410 grams per liter, which is still in excess of the rule requirement of 300 grams per liter of VOC, less water and less exempt compounds. More recent attempts to reformulate the VOC content with higher volumes of acetone, and lower volumes of VOCs and solids, have not been favorable to the 300 grams of VOC per liter limit. This presents technical challenges that cannot be resolved for every color and type (visible, visible under ultra-violet light, and thermochromic) due to low ink solids, and high volumes of acetone which must be subtracted out for rule compliance purposes. Rule 1125 has no provisions for low-solids coatings/inks, which are calculated for VOC content on a material basis, including exempt compound or water dilution.

Ultra-violet (UV) curable inks could resolve this issue except that their viscosity is too high for this application at 100 percent solids formulas, even if heated to jettable temperatures, so that they must be mixed with organic solvents, and the environmental benefit can be lost. CIJ requires inks with a viscosity between 1 to 5 centipoises; UV can only obtain viscosities of 10 centipoises¹, unless formulated with solvents. UV inks are in wide use in piezoelectric (PZT) printhead technology; however this technology does not provide the necessary print speed of CIJ printing. PZT inkjet technology supplies picoliter ink droplets on demand, through PZT ceramic crystal flexure created by the application of an electric current pulse to the PZT. UV inks are generally based on acrylate mixtures that do not contain electrically conductive components and are therefore less easily adapted for use in CIJ printing. If there is a drawback, it is the cost

¹ New Developments in the Commercialization of UV Curable Inkjet Inks, Sartomer Company, Jeffrey Klang and James Balcerski, August 2002

of the chemistry, as it can be twice as high as conventional inks. Staff is unaware of any CIJ printing being done with UV technology, but does not discount its possibilities.

End Sealing Compounds

In order to manufacture a pressurized container or one that holds liquid components, the ends of it must be fluid tight. This is accomplished with the application of a sealing compound, prior to crimping the top and/or bottom of the can to the can body. Today the VOC limit for food and beverage can end sealing compound is 440 grams per liter. Other California air districts such as the Bay Area Air Quality Management District and the San Joaquin Valley Air Pollution Control District have VOC limits of 20 grams per liter.

Staff's research verified the feasibility of using end sealing compound formulations meeting the 20 grams per liter limit. Specifically, staff has identified the companies in the South Coast Air Basin that manufacture metal food and beverage containers using end sealing compounds containing less than 20 grams of VOC per liter. Staff is therefore recommending this VOC limit be revised in Rule 1125, without changes in cost and other socio-economic factors, because they are already in use.

UNIVERSE OF SOURCES

Staff has identified four can manufacturing facilities that use CIJ or ink-dot printing. Two manufacture two piece beverage cans; one makes two-piece food containers, while the fourth makes three piece aerosol cans. One additional coil coating facility is working on a marking system, as per customer needs. All equipment are operated under Rule 219 – Equipment not Requiring a Permit to Operate due to the small volumes of inks used on a daily basis and the resulting low emissions rate (not emitting more than three (3) pounds per day or 66 pounds per calendar month of VOC emissions).

Only three ink formulations are currently used within the basin. One formula is used for ink-dot marking, and two separate formulas are used for the two CIJ printing operations. All formulas exceed the rule required VOC content of 300 grams per liter, less exempt compounds, under the current ink category.

EMISSIONS INVENTORY AND EMISSIONS IMPACTS

Inkjet and Ink-dot Printing

The following inventory (see Table 1) is taken from company records for the year 2006. VOC contents expressed as gm/l less exempt compounds are for regulatory compliance comparisons, whereas, material VOCs are actual VOC contents. The total daily average VOC emissions from inkjet/ink-dot printing for Rule 1125 sources is 1,469 lb VOC/yr/365days/yr = 4.0 lb/day.

Foregone emissions can only be estimated because of the low-solids of these inks. In general an ink with 300 grams of VOC per liter, without water or exempt compounds will have an actual (material basis) VOC content of 95 grams per liter (0.79 pounds VOC per gallon). Since the dot volumes (picoliters or nanoliters) are the same size there is a one to

one volume relationship, and the excess emissions are the difference between the actual VOC contents. Table 2 gives those approximations on the following page:

Table 1: Annual VOC Emissions from Inkjet/Ink-dot Printing

Company	Ink VOC, less exempt compounds gm/l (lb/gal) -A-	Make-up Solvent VOC, less exempt compounds gm/l (lb/gal) -B-	Material Ink VOC Content gm/l (lb/gal) -C-	Material Make- up Solvent VOC Content gm/l (lb/gal) -D-	Gallons of Ink Used per Year -E-	Gallons of Make- up Solvent Used per Year -F-	Annual Emissions (lb/yr) (C * F) + (D*F)
Ball Metal Container Corp.	410 (3.42)	790 (6.59)	130 (1.09)	140 (1.17)	16	195	246
Impress USA, Inc.	693 (5.78)	798 (6.66)	693 (5.78)	798 (6.66)	17	115	864
Metal Container Corp.	644 (5.58)	-	245 (2.04)	-	140	-	286
Rexam Beverage Can Company	644 (5.58)	-	245 (2.04)	-	36	-	73
Total							1,469

Table 2: Annual VOC Emissions Foregone From Inkjet and Ink-dot Applications

Company	Actual Ink VOC Content (lb/gal) -A-	Actual Make- Up Solvent VOC (lb/gal) -B-	Allowable VOC Content (lb/gal) -C-	Gallons of Ink Used per Year -D-	Gallons of Make- Up Solvent Used per Year -E-	Excess Emissions (lb/yr): (A*D)+(B*E) - (C*(D+E))
Ball Metal Container Corp.	1.09	1.17	0.79	16	195	79
Impress USA, Inc.*	5.78	6.66	0.79	17	115	760
Metal Container Corp.	2.04	-	0.79	140	-	175
Rexam Beverage Can Company	2.04	-	0.79	36	-	45
Total						1,059

* Impress uses thermochromic inks that change color when heated, a safety precaution for cooked foods.

Therefore, the average emissions foregone on a daily basis is 1,059 lb VOC/yr/365 day/yr = 2.9 lb VOC/day, comparing the current rule to what is being used today.

End Sealing Compounds

Since staff is recommending lowering the VOC limit for food and beverage end sealing compounds, a SIP creditable difference exists between the current allowable limit of 440 grams per liter (solvent-based) and 20 grams per liter (waterborne). The solids content of waterborne sealants and a solvent borne sealants of various grades foods and beverage grades are relatively the same. On the average, this is approximately 60 percent by weight. Therefore, there will be no additional mileage obtained from using either one, and the existing inventory (pounds of end sealants used per year) are the same. Table 3 gives the current inventory and emissions used by the three can manufacturers that use end sealing compounds in their processes. The average sealant density used to convert from pounds to gallons is 9.385 pounds per gallon, as average from several different sealant types.

Table 3: End Seal Use in the AQMD

Name	Use (lb/day)	Use (gal/day)	Emissions at 440 gm VOC/l (lb/day)	Emissions at 20 gm VOC/l (lb/day)	Creditable Difference (lb VOC/day)
Metal Container	886.5	94.5	347	16	331
Ball Container	99.3	10.6	39	2	37
Impress USA	668	71.2	261	12	249
Total					617

The total emissions change as a result of this proposal will be the foregone 3 pounds per day of VOCs from inkjet/inkdot printing and the creditable difference between 440 grams of VOC per liter and the new proposed allowable VOC limit of 20 is 617 pounds of VOC per day. Therefore, the total is (617 – 3) lb VOC/day/2000 lb/ton = 0.31 tons VOC/day.

STAFF PROPOSAL

Staff proposes to amend Rule 1125 as follows:

- Add a definition for inkjet ink, make-up solvent, and material basis VOC content.
- Limit the VOC content to 250 grams per liter of material for both inkjet ink and makeup solvents. Add a category for thermochromic inks and regulate these ink types at 700 grams of VOC per liter of material while allowing make-up solvents at 800 grams per liter of VOC. Material basis VOC contents are more applicable to low solids, low viscosity inks. Maintain the current limit of 300 grams per liter

of ink, less water and less exempt compounds for non inkjet inks (such as lithographic and gravure inks).

- Amend the VOC content for food and beverage related end sealing compounds from 440 grams per liter to 20 grams per liter on the basis of achieved in practice reasonably available control measures.
- Consistent with other coatings related rules, change the reference to 65 percent transfer efficiency, a demonstration of equivalent or better transfer efficiency of high-volume, low pressure (HVLP) spray. This is needed because the existing language implies that all HVLP spray equipment achieves 65 percent transfer efficiency regardless of various factors that affect transfer efficiency like part geometry, spray gun to target distance, shaping air pressure and a host of other technical reasons.
- Change the title of subdivision (e) to Methods of Analysis and add an introductory paragraph giving latitude to conduct analysis under other methodologies not specifically addressed within the rule, but may come in the future, provided that written approval has been obtained from the appropriate federal, state and local agencies. Add the U.S. EPA approved capture efficiency test procedures presented in the U.S. EPA technical guidance document “Guidelines for Determining Capture Efficiency, January 9, 1995” in subparagraph (e)(2)(A). This guideline establishes the criteria for determining a permanent total enclosure, which may lead to a declaration of 100 percent capture efficiency. Latitude is again afforded to other test methods, notwithstanding the test methods specified by the Guidelines, as long as approval has been received by the federal, state and local environmental agencies.
- Add Method 25.3 (Determination of Low Concentration of Non-Methane Non-Ethane Organic Compound Emissions from Clean Fueled Combustion Sources). This method can detect concentrations down to 1 ppm by volume, and is the method of choice when low loading and/or low air pollution control equipment outlet concentrations are expected.
- Other minor modifications for rule clarity, and test methodology updates are also being incorporated.

COST EFFECTIVENESS AND INCREMENTAL COST EFFECTIVENESS

Staff has determined that low-solids inkjet/ink-dot inks used within the metal can and coil industries cannot meet the VOC limits specified in Rule 1125 for other ink applications on a less water and less exempt compound basis. Alternative compliant inks are not currently available and are not expected to be available in the foreseeable future. The proposed inkjet/inkdot and make-up solvent limits will satisfy what is currently being used for high speed marking in the can manufacturing industry today. As such, there are no additional costs or other socioeconomic impacts for these proposed amendments. Furthermore, since end sealing compounds with less than 20 grams of VOC per liter are

currently achieved in practice and being used, there are no additional costs to be calculated or assessed on the industry with the lowering of the VOC content from 440 to 20 grams per liter, less water and less exempt compounds.

Health and Safety Code Section 40920.6 requires an incremental cost effectiveness analysis when there is more than one control option available to achieve the emission reduction objective of the proposed amendments, relative to ozone formation in this case. Staff has found no other available ink chemistries that will provide the necessary dry times and conductivity necessary to print at the required speed of continuous inkjet without the use of some VOC additives. Therefore, a second alternative ink is unavailable.

Add-on fugitive VOC capture and control systems would simply not be cost effective due to the small magnitude of annual VOCs available for capture and destruction compared to the capital and annual operating and maintenance costs for inkjet operations. The proposed end sealing compound limit already represents a VOC reduction of 95 percent overall and therefore is at least equivalent to add-on control. It can be demonstrated that to add capture and control equipment to inkjet/inkdot manufacturing lines would be not be cost effective, on a discount cash flow basis to control an excess of 2.9 pounds of VOC per day industry-wide. The economics analysis equation is given below, where DCF means discounted cash flow:

$$DCF = \frac{\text{Capital Costs} + (\text{Annual O\& M Costs} \times 8.11)}{\text{Emission Reductions}_{\text{ton/day}} \times 365 \text{ day / yr} \times 10 \text{ years}}$$

From previous work conducted in 1998 the absolute minimum installation and equipment costs for an air pollution control (APC) system is \$250,000, and we have four companies. The annual operating costs are on the order of half the APC system cost. The excess emissions associated with controlling down to 300 grams per liter for this rule are 2.9 pounds per day (0.00145 ton/day) from Table 1, therefore,

$$DCF = \frac{(4)(\$250,000) + (0.5)(4)(\$250,000)(8.11)}{0.00145, \text{ton / day} \times 365 \text{ day / yr} \times 10 \text{ years}}$$

$$DCF = \$955,125/\text{ton abated}$$

Staff concludes that add on controls are highly cost-ineffective for this application.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA) and AQMD Rule 110, an Environmental Assessment (EA) has been prepared for proposed amended Rule 1125 and was circulated for review. Responses on the two comments received on the Draft EA are incorporated into the Final EA.

SOCIOECONOMIC ANALYSIS

The proposed inkjet/inkdot and make-up solvent limits allow use of current inkjet technology for their users, thereby resulting in no change to existing operations. There would be no additional costs associated with complying with a lower VOC limit for end sealing compounds since the lower limit codifies the existing practice. Overall, the proposed amendments would result in no costs to the affected facilities.

LEGISLATIVE AUTHORITY

The California Legislature created the AQMD in 1977 (The Lewis-Presley Air Quality Management Act, Health and Safety Code Section 40400 et seq.) as the agency responsible for developing and enforcing air pollution control rules and regulations in the Basin. By statute, the AQMD is required to adopt an Air Quality Management Plan (AQMP) demonstrating compliance with all state and federal ambient air quality standards for the Basin [California Health and Safety Code Section 40460(a)]. Furthermore, the AQMD must adopt rules and regulations that carry out the AQMP [California Health and Safety Code Section 40440(a)].

COMPARATIVE ANALYSIS

Section 40727.2 of the California Health and Safety Codes requires a written analysis comparing the proposed rule with existing federal regulations, and any other AQMD existing or proposed rules and regulations that apply to the same source type.

There are no federal requirements or AQMD rules applicable to the same sources for inkjet printing operations. The proposed VOC limit for end sealing compounds, however, may exceed the New Source Performance Standards for the beverage can industry, because of a difference in the compliance units, i.e., kilograms of HAPS per liter of coating solids, vs. grams of VOC per liter, less water and less exempt compounds. As a result, for end sealing compounds, the following elements of the requirements are compared:

- Averaging provisions. There are none allowed or proposed, unless through existing Rule 108 provisions. The units used are consistent with standard federally enforceable terminology.
- Operating parameters and work practice requirements. None are being changed or addressed by these proposed amendments.
- Monitoring, reporting, and recordkeeping requirements. None are proposed to be changed. Existing rules and regulations such as Regulation III and Rule 109 are still enforced.

Staff conducted a technical assessment for Rule 1125 in May 2005. The following is taken from that report:

New Source Performance Standards (NSPS) govern the operation of all new, modified, or reconstructed sources of air pollution identified in Part 60 of the Code of Federal Regulation (CFR). NESHA are codified in two Parts of the CFR. The 1990 Amendments to the federal Clean Air Act called for the EPA to establish maximum

achievable control technology (MACT) standards for new and existing major sources of hazardous air pollutants (HAP), starting within two years of enactment and finishing within ten years. The MACT standards are published in the CFR as Part 63. MACT standards apply to major sources, defined as any source emitting ten tons or more per year of any HAP or twenty-five tons or more per year of any combination of HAPs.

NSPS and NESHAP regulations exist for two of the three source categories under Rule 1125. The can NSPS is for beverage cans only and is identified as CFR 40 Part 60 Subpart WW – Standards of Performance for the Beverage Can Surface Coating Industry. This rule is applicable to sources constructed or modified after November 26, 1980. The NESHAP for can coating is Subpart KKKK as noted above. The NESHAP for surface coating of metal coil is CFR 40 Part 63 Subpart SSSS. The NSPS for this source category is CFR 40 Part 60 Subpart TT – Standards of Performance for Metal Coil Coating and is applicable to sources constructed or modified after January 5, 1981. Rule 1125 does not supersede the requirements of any federal regulation.

Staff compared the emission reduction requirements of Rule 1125 to the applicable NSPS and NESHAP emission reduction requirements. Rule 1125 sets specific VOC limits for coatings or allows the use of an emission control system which collects 90 percent of the generated emissions and destroys 95 percent of them to reduce emissions to a level equivalent to 85.5 percent of those generated (the product of capture and destruction efficiencies). As opposed to setting specific VOC content limits, the NSPS for beverage cans establishes a discharge limit of VOC on the basis of a volume-weighted calendar-month average emission for 2-piece can exterior base coat operations, clear base-coat and overvarnish coating operations, and two-piece can inside sprays. The limits expressed in kilograms of VOC per liter of coating solids are comparable to Rule 1125 VOC gram/liter limits or lbs/gal. If an operator chooses to use coatings that exceed these limits, control equipment may be used that reduce VOC emissions to a level equivalent to or less than the limit specified by coating category in the NSPS. However, no specific collection or destruction efficiency is stated in the applicable federal regulation, instead a weighted average in the federal regulation calculation of VOC emitted for a calendar month is used to determine compliance. All facilities in the AQMD using add-on control technology to achieve compliance are operating at overall efficiencies at or above 90 percent.

The NESHAP for can coating states the estimated goal of overall reduction of HAPs to be 70 percent from the baseline emissions. As opposed to the NSPS which covers only beverage cans, the NESHAP is applicable to coatings applied during any stage of the can manufacturing process to metal cans or ends, or to metal crowns or closures for any type of can body. The NESHAP, like the NSPS establishes limits as kilograms of HAP per liter of solids or the use of a control device. If the source is new or reconstructed, the requirement is for a reduction in total HAPs by 97 percent or limit the emissions of total HAPs, measured as total hydrocarbons (THC), or 20 parts per million by volume, dry (ppmvd) at the control device outlet and using a permanent total enclosure (PTE). Existing sources must reduce total HAPs by 95 percent or limit emissions of total HAPs, measured as THC, or 20 ppmvd, at the control device outlet while using a PTE. As these

measurements are for total HAPs, reductions are also allowed by work practice standards to reduce HAPs from mixing, cleaning, storage and waste handling areas.

While PTE may be an appropriate and effective method of control for VOC for new facilities, it is not a cost-effective method of control for most existing coating lines due to the configuration and size of the lines. Based on cost data obtained by staff from one PTE installation at \$92 per square foot, the estimated cost of building a 38,000 square foot PTE (average estimate from several can companies) is approximately \$3.5 million. The incremental cost effectiveness to build a PTE to increase the collection efficiency from 90 percent to 100 percent is calculated as \$27,000 per additional ton of VOC reduced. This cost does not include the cost of such items as fire suppression system, electrical reconfiguration, and perhaps a new basic control device to accommodate the PTE. It is difficult to retrofit an existing manufacturing facility to meet EPA's requirements to be classified as a PTE. Thus, the PTE is not cost-effective for most existing sources.

The coil coating operations subject to NSPS for this category are limited to the discharge of VOC on a monthly basis with limits comparable to Rule 1125 or allowed the use of control equipment operated at an efficiency of 90 percent or average the mass of VOC emitted for the calendar month to be equivalent to the VOC limit (0.14kg/l of coating solids applied) comparable to the Rule 1125 daily limit of 1.7 lbs/gal. The NESHAP limits emissions to no more than 2 percent of the HAPs applied each month or use an oxidizer with an overall efficiency of 98 percent. Currently, all coil coating facilities in the AQMD complying with Rule 1125 by using control equipment are operating at greater than 90 percent overall efficiency. As indicated in the paragraph above, it is not cost-effective to require an increase in the VOC control efficiency from 90 to 98 percent.

REQUIREMENT TO MAKE FINDINGS

Before adopting, amending, or repealing a rule, the California Health and Safety Code Section 40727 requires the AQMD to adopt written findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report.

Findings

Necessity - The AQMD Governing Board has determined that a need exists to amend Rule 1125 – Metal Container, Closure, and Coil Coating Operations to set a VOC limit for food and beverage can related end sealing compounds, based on feasible technology currently in use and to set VOC limits for inkjet inks and inkjet make-up solvents based on available technology.

Authority - The AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from the California Health and Safety Code Sections 39002, 39650, 40000, 40001, 40440, 40702, 41508, and 41700, et seq.

Clarity - The AQMD Governing Board has determined that the proposed amendment to Rule 1125 is written or displayed so that persons can easily understand its meaning that are directly affected by it.

Consistency - The AQMD Governing Board has determined that Proposed Amended Rule 1125 is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

Non-Duplication Rule 1125 does not impose the same requirements as any existing state or federal regulations, and the proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD.

Reference - In adopting this regulation, the AQMD Governing Board references the following statutes which the AQMD hereby implements, interprets or makes specific: California Health and Safety Code Sections 40440(a) (rules to carry out the Air Quality Management Plan), and 40440(c) (cost-effectiveness), 41508, and Federal Clean Air Act Section 172(c)(1) (RACT).

AQMP AND LEGAL MANDATES

The 2007 AQMP contains control measure MCS-07, Application of All Feasible Measures, and although Rule 1125 is not specifically listed, all coatings rules are periodically subject to review to determine if cost-effective emission reductions are feasible as new best available retrofit technology standards become available in the future.

An examination of the current status of coating operations covered by Rule 1125 was conducted in May 2005 and it concluded, based on review of both coating and add-on control technology, that no rulemaking for Rule 1125 should be initiated at this time. However, it also concluded inkjet printing is not currently adequately addressed by Rule 1125. This proposed amendment to Rule 1125 will now address inkjet printing associated with the beverage, food and aerosol container industries, and update Rule 1125 for the available, and in use, lower VOC content end sealing compounds for food and beverage related can manufacturing. This will lead to a SIP creditable emission reduction of 0.31 tons of VOC per day.

COMMENTS AND RESPONSES

A public workshop was held on January 8, 2008 comments were received after the public workshop.

Comment No. 1

Our company has been involved in UV curing of inks and coatings for the metal packaging industry since the early 1970's. The benefits of UV technology are numerous and particularly well suited to reducing VOC's, HAPS, and CO2 emissions.

Response

Staff recognizes the contribution of UV technology in helping to reduce air pollution, and encourage its use, but we were unaware of any CIJ printing being done with UV. One

possible reason may be that it has not yet been cost effective to develop substitutes for these generally high-solids inks used in such low volumes. However, staff will continue to monitor the available uses and technology, such as UV for this niche application.

Comment No. 2

UV/EB technology has a place in many of the operations at a can manufacturing plant for three piece can sheet exterior basecoats and overvarnishes, as well as two piece can exterior overvarnish, new metal pail topcoats, coil coatings, as well as non-inkjet printing operations. Side seam spray coatings, and inkjet inks are currently under development, but not commercially available. We would very much appreciate the inclusion of UV/EB technology and the role it plays in the metal container closure and coil coatings market in your technical analysis.

Response

Staff appreciates the air quality benefits from the use of UV/EB technology and encourages the introduction of this and other low-emission technologies for coating applications in the metal container, closure and metal coil industry. Although the use of these technologies are promising, further demonstration that their use is technologically achievable and cost effective in all applications is necessary before they can be mandated as a substitute for current coating technologies. Staff will continue to assess the development and encourage the use of these and other low-emission technologies for consideration as appropriate in future rule amendments

Comment No. 3

The replacement language in subparagraph (c)(4)(G) for equivalent or better transfer efficiency to HVLP spray may impact our inside seam spray operations on our can manufacturing line. Testing previously conducted showed our spray equipment to meet the 65 percent requirement. Will anything additional need to be done to demonstrate equivalence to HVLP? Furthermore, what transfer efficiency method will inkjet printing fall under?

Response

The change in the method for demonstrating an equivalent transfer efficiency was because for most applications it is difficult to demonstrate a 65 percent or better transfer efficiency, whereas a comparison with the HVLP spray technique is feasible to demonstrate. However, if your application for testing has demonstrated a transfer efficiency of 65 percent or greater, no further testing will be required. Regarding the transfer efficiency for inkjet printing, most printing application techniques, such as inkjet printing, do not result in overspray. Language has been added to paragraph (c)(4) to clarify inkjet printing is an acceptable application technique for transfer efficiency.