Ventura County Air Pollution Control District
FINAL STAFF REPORT – February 29, 2008

Revisions To Rule 74.12
SURFACE COATING OF METAL PARTS AND PRODUCTS

EXECUTIVE SUMMARY

Rule 74.12, Coating of Metal Parts and Products, was first adopted on November 19, 1985, and has been the subject of several revisions. The proposed revisions are required because, under the provisions of Health and Safety Code § 40914(b)(2), staff is required to demonstrate that the District's plan to attain the California ambient ozone standard provides for expeditious implementation of "every feasible measure" to reduce ozone precursor emissions (including reactive organic compounds, or ROC).

On October 9, 2001, the Ventura County Air Pollution Control Board adopted an addendum to the Ventura County Triennial Plan that included a Feasible Measure to amend Rule 74.12. This proposal will also implement Best Available Retrofit Control Technology (BARCT) as required by the California Clean Air Act.

Staff proposes two revisions to Rule 74.12. The first is to reduce the current ROC limit for general air-dry coatings ("all coatings except the following") from 2.8 pounds of ROC per gallon (lb/gal) to 2.3 lb/gal. In addition, a new coating category, "Multi-Component Coatings," will be created with an ROC content limit of 2.8 lb/gal. This category excludes other listed specialty multi-component coatings. These revisions are based on similar coating categories and standards in South Coast Air Quality Management District (AQMD) Rule 1107, which became effective on March 1, 1999. Complying coatings are available and currently in use in both the AQMD and Ventura County.

The second revision will reduce the ROC content limit for surface preparation and cleanup solvent to 25 grams of ROC per liter (0.21 lb/gal). This limit appears in the November 7, 2003, revision to South Coast Air Quality Management District (SCAQMD) Rule 1171, *Solvent Cleaning Operations*. The proposal is feasible because complying solvents are available; these include acetone, acetone-blended solvents, and water. These solvents are currently in use at many metal parts paint shops in the county.

The proposed revisions may affect approximately 27 out of 53 facilities in Ventura County that coat metal parts or products. These facilities emit about 35 tons of ROC per year. The proposal will reduce ROC emissions by about 19 percent, or 6.64 tons per year. About 36 percent of the emission reduction results from the change to the coating requirements; the remainder results from the proposed low-ROC solvent requirements.

The cost-effectiveness of replacing certain 2.8 lb/gal coatings with 2.3 lb/gal coatings is $15,441 per ton of ROC reduced. It is possible to estimate cost-effectiveness because complying high-performance, one-component topcoats and primers at 2.3 lb/gal are readily available.

The cost-effectiveness of the proposed low-ROC solvent requirement can also be estimated because complying solvents are available. The cost-effectiveness of this proposal ranges from $359 per ton of ROC reduced to $6,470 per ton.

Emission Source Inventory

The 53 metal surface coating operations are currently permitted in Ventura County, as shown in Appendix A. City location, Standard Industrial Classification (SIC) Code, and SIC Code description are included. Of these, 29 are known to use complying solvent in their process; acetone, water, and other zero-ROC solvents are used. Three facilities use a combination of acetone and solvent, and six are unknown. Only 18 sources are known to use a non-complying solvent (see Appendix B)

In addition, 33 comply with the proposed 2.3 lb/gal coating requirement; 20 sources will be required to switch to lower-ROC coatings (see Appendix C).

PROPOSED REVISIONS

Rule 74.12, Coating of Metal Parts and Products, was first adopted on November 19, 1985. The proposed revisions are required because, under the provisions of Health and Safety Code § 40914(b)(2), staff is required to demonstrate that "every feasible measure" to reduce ozone precursor emissions is being done. The following amendments are proposed to reduce ROC emissions at metal surface coating operations:

1. Implement a lower ROC limit for general air-dry one-component coatings and create a new multi-component coating category. Eliminate the special category for lab furniture coatings.

2. Implement the use of low-emission cleanup solvents for spray gun and general purpose cleanup. ROC content will be limited to no more than 25 grams per liter (g/l), or 0.21 lb/gal.

The effective date for these requirements is 90 days from the date of adoption by the Ventura County Air Pollution Control Board.

Low-ROC Coating Requirements

In Subsection B.1, staff proposes to reduce the ROC limit for general purpose, single component, air-dry coatings ("all coatings except the following") from 2.8 lb/gal (340 g/l) to 2.3 lb/gal (275 g/l). In addition, a new coating category will be created for general multi-component coatings ; the ROC limit will be 2.8 lb/gal, or 340 g/l. The new category will exclude all multi-component coatings listed in the remainder of the ROC Limit chart. This proposal is based on the March 1, 1999, version of South Coast AQMD Rule 1107. The proposal does not change the ROC limit for baked coatings (2.3 lb/gal).

In a related proposal, the high-gloss coating category will be limited to two-component coatings. Without this change, coating manufacturers may circumvent the revised ROC content limit above by relabeling one-component coatings for high gloss application. The current ROC content limit in the high gloss category is 3.5 lb/gal (420 g/l).

Staff also proposes to delete the Laboratory Furniture coating category. This is possible because the only lab furniture coating company in the county, Hanson Lab Furniture, currently uses a 2.3 pounds per gallon waterborne baked acrylic enamel from Cardinal Coatings. This material is in compliance with the proposed one-component coating limit. Also, SCAQMD Rule 1107 does not include a separate category for lab furniture coating.

To accomplish these changes, a modified ROC content chart will be added to Subsection B.1. A strikeout/underline version of the chart appears in Table 1.

Low-Emission Cleanup Solvent

Staff proposes to amend Subsection B.4 to limit the ROC content of all cleanup solvent used for spray gun cleaning and general purpose cleanup to 25 g/l. As previously noted, the effective date will be 90 days from the date of adoption. The proposed revisions will appear in Subsection B.4 as follows:

Surface Preparation and Cleanup:

a. After (90 days from date of adoption), no person shall use a material for substrate surface cleaning that has an ROC content exceeding 25 grams per liter of material.

~~a.~~ On or before (90 days from date of adoption), ~~No~~ no person shall use any material which contains more than 70 grams of ROC per liter of material for substrate surface cleaning.

Substrate surface cleaning performed in a degreasing unit operated in compliance with the requirements of Rules 74.6.1, 74.6.2 or 74.6.3 as applicable shall not be subject to this ROC content limit.

b. After (90 days from date of adoption), no person shall use a material for either spray equipment cleaning or cleanup that has an ROC content exceeding 25 grams per liter of material.

~~b.~~ On or before (90 days from date of adoption), ~~No~~ no person shall use organic solvent for cleanup unless:

1) An enclosed gun washer or "low emission spray gun cleaner" that has been approved in writing by the APCO is properly used for spray equipment cleaning, and

2) The ROC composite partial pressure of organic solvent used for cleanup, including spray equipment cleaning, is less than 45 mm Hg at 20°C.

Table 1
Revisions ROC Content Chart in Subsection B.1

Coating	Air Dried g/L	Air Dried lb/gal	Baked g/L	Baked lb/gal
All coatings except for the following:	275 ~~340~~	2.3 ~~2.8~~	275	2.3
Multi-Component not listed below	340	2.8	275	2.3
Camouflage	420	3.5	360	3.0
Extreme Performance	420	3.5	360	3.0
Etching Filler	420	3.5	420	3.5
Heat Resistant	420	3.5	360	3.0
High Gloss (2 Component)	420	3.5	360	3.0
High Performance Architectural	420	3.5	420	3.5
High Temperature	420	3.5	420	3.5
~~Laboratory Furniture~~	~~340~~	~~2.8~~	~~340~~	~~2.8~~
Metallic	420	3.5	360	3.0
Mold Seal	420	3.5	420	3.5
Pan Backing	420	3.5	420	3.5
Pretreatment Wash Primer	340	2.8	275	2.3
Silicone Release	420	3.5	420	3.5
Solar Absorbent	420	3.5	360	3.0
Vacuum Metalizing	420	3.5	420	3.5

Other Proposed Revisions

To accommodate the new coating categories, definitions of "One-Component Coating" and "Multi-Component Coating" are being added to Section G of the rule, as follows:

31. "Multi-Component Coating": A coating requiring the addition of one or more separate reactive resins, commonly known as catalyst or hardener, prior to application to form an acceptable dry film.

32. "One-Component Coating": Any coating that is ready for application as it comes out of its container to form an acceptable dry film. A thinner or reducer, necessary to reduce the viscosity, is not considered a component.

In Subsection B.7, the *Liquid Cleaning Material Compliance Statement* will be amended to exclude ROC Composite Partial Pressure information. This information will not be necessary 90 days after the date of adoption. Other minor text changes in other subsections are also proposed.

The definition of High Volume-Low Pressure (HVLP) spray equipment is being updated to be consistent with other District rules. The existing definition in Subsection G.24 will be replaced with the following:

25. "High Volume-Low Pressure (HVLP)": Equipment used to apply coatings by means of a spray gun designed to be operated and operated between 0.1 and 10 pounds per square inch gauge (psig) air pressure measured dynamically at the center of the air cap and at the air horns.

The identification of HVLP spray equipment in the field has been an issue for District inspection staff.

To assist in this, staff proposes a paragraph in Section E, Test Methods, to specify methods of identification that may be used, as follows:

9. High Volume-Low Pressure (HVLP) equipment shall be identified by either test air cap measurements or an inlet pressure measurement that, when used with specifications published by the manufacturer, establishes that gun is being operated as specified in Subsection G.16.

As suggested by USEPA on another coating rule, we propose to strike existing Subsection E.4 on capture and control efficiency determinations and replace it with the following:

4. Capture efficiency shall be determined according to EPA Guidelines for Determining Capture Efficiency, dated January 9, 1995, and 40 CFR 51, Appendix M, Methods 204-204F as applicable. Control system efficiency shall be determined by 40 CFR 60, Appendix A, Methods 18, 25 or 25A.

In addition, at EPA's suggestion, a definition of "Capture Efficiency" is being added to Section G:

7. "Capture Efficiency": The percentage of ROC used, emitted, evolved, or generated by the operation, that are collected and directed to an air pollution control device.

DISCUSSION

Emission Reductions

The proposed amendments to Rule 74.12 will reduce actual ROC emissions from the coating of metal parts and products about 19 percent, or 6.64 tons per year (tpy). About 36 percent of the emission reduction (2.40 tpy) results from the change in coating requirements. The remaining 64 percent (4.24 tpy) results from the proposed 25 g/l threshold for cleaning solvents.

Low-Emission Cleaning Solvent

Acetone is currently used by a number of metal surface coating operations for surface preparation, gun cleaning and general cleanup. Water is also used. Although acetone has a high vapor pressure and is extremely flammable, it is an exempt organic compound because its photochemical reactivity is low.

Several vendors currently sell acetone-blend cleaning solvents that comply with the proposed revision. The performance of these cleaners has been demonstrated by their wide use in southern California. These cleaners include:

- Pacific Coast Lacquer (PCL) 2085B
- Oxsol 100 (PCBTF, Parachlorobenzotrifluoride)

As shown in Appendix B, 18 of the 53 metal surface coating facilities in Ventura County use a known quantity of solvent for surface preparation and cleaning. Based on actual solvent use rates, the ROC solvent emission rate from these sources is 4.40 tons per year. If it is possible to use either water or an exempt solvent at these facilities, the entire 4.40 tons per year can be eliminated. If solvents meeting the 25 gram/liter requirement are used, an ROC emission reduction of 4.24 tons per year is possible.

Low-ROC Coating Requirements

Complying one-components coatings (including high gloss coatings) are available to meet the proposed ROC content limit of 2.3 pounds per gallon. A number of manufacturers offer compliant coatings; see Appendix D for more details.

Of the 53 metal surface coating facilities in Ventura County, 20 are known to use single component coating materials that exceed 2.3 lb/gal (see Appendix C). The emission limit for these coatings is being reduced to 2.30 lb/gal from 2.80 lb/gal. Based on actual coating use, ROC emissions from these sources is 34.5 tpy. If coatings meeting the 2.30 lb/gallon requirement are used, an ROC emission reduction of 2.40 tpy is possible.

Cost-Effectiveness

Low-Emission Cleaning Solvent

Both acetone and water are popular substitutes for non-exempt ROC solvents. Both options have an ROC content of zero. It also appears that most ROC solvent is used for spray gun cleaning. With this in mind, staff has attempted to estimate the cost of switching from an ROC solvent to either acetone or one of two other popular exempt cleaning materials.

Staff assumed that the ROC solvent currently in use is common lacquer thinner; local inquiries establish the cost of this solvent at $12.00 per gallon. The cost of acetone is about $14.00 per gallon, for a cost differential of $2.00 per gallon. As noted above, an ROC emission reduction of 4.40 tons per year can be assumed when an exempt solvent us used. Based on this information, and the annual county-wide solvent use total in Appendix B, the following cost effectiveness is estimated.

($2/gal)*(1524 gal/yr) / (4.40 ton/yr) = $693 per ton of ROC reduced

Pacific Coast Lacquer (PCL) 2085B is a replacement solvent that meets the 25 gram/liter requirement. If this material is used, an ROC emission reduction of 4.24 tons per year is possible. PCL states that the cost is about one dollar more than lacquer thinner.[1] The resulting cost-effectiveness is:

($1/gal)*(1524 gal/yr) / (4.24 ton/yr) = $359 per ton of ROC reduced

Another popular compliant solvent is PCBTF (Parachlorobenzotrifluoride), commonly known as Oxsol 100, an exempt compound. The local cost of this material is about $30 per gallon. Staff has no information on the usefulness of this material in metal surface coating. Nevertheless, the cost-effectiveness of this material is:

($18/gal)*(1524 gal/yr) / (4.24 ton/yr) = $6,470 per ton of ROC reduced

The District maintains a Best Available Control Technology (BACT) cost-effectiveness guideline of $18,000 per ton of ROC reduced. All of the above estimates are well below this threshold. Therefore, the proposed revisions are reasonable based on the cost of control.

Low-ROC Coating Requirements

As shown in Appendix D, a number of complying one-component topcoat and primers with an ROC content of 2.3 pounds per gallon or less are readily available. Staff surveyed a number of coating suppliers and got current prices for 14 complying coatings; the average cost of these coatings is $41.95 per gallon. In addition, prices for four in-use costing were also obtained; the average cost is $38.05. The difference in cost is $3.90 per gallon.

Based on this information, and the amount of annual coating use in Appendix C, the following cost effectiveness is estimated:

($3.90/gal)*(9502 gal/yr) / (2.40 ton/yr) = $15,441 per ton of ROC reduced

As noted above, the District maintains a BACT cost-effectiveness guideline of $18,000 per ton of ROC reduced. The above estimate is below this threshold. Therefore, the proposed revisions to the coating requirements are reasonable and cost-effective.

Incremental Cost-Effectiveness

Health and Safety Code Section 40920.6 requires the performance of an incremental cost-effectiveness analysis for a regulation that identifies more than one control option to meet the same emission reduction objectives. Incremental cost-effectiveness is defined as the difference in costs divided by the difference in emission reductions between one level of control and the next more stringent level of control.

No alternate control option is identified for the proposed 25 g/l ROC solvent requirement.

Low-ROC Coating Requirements

Staff has identified one alternate control option that is not being proposed at this time. This control option would require the use of air-dried and baked topcoats with an ROC limit of 50 grams per liter. The primary coating technology available for this option is powder coating.

For this option, powder coatings with an ROC content of less than 50 g/l are used in place of the solvent-based coatings at 380 g/l (2.8 lb/gallon). Information on the coatings under consider-ation in this control option appears in Table 2.

Table 2
Coating Data Used for
Cost Analysis for Alternative Option

Existing Coatings	
VOC (lbs/gal)	2.8
Cost ($/gallon)	$38.05
Volume Solids (%)	50
Zero ROC Coatings	
VOC (percent)	0 – 2
Cost ($/pound)	$4.25
Volume Solids (%)	98
Ratio of Solids[a]	0.51

a - Ratio of solids = coverage correction factor.

Before the incremental cost-effectiveness is determined, the cost-effectiveness of the alternate control option must be calculated. Actual ROC emissions

from metal surface coating operations in Ventura County using liquid coatings are estimated to be 24.65 tons per year; existing powder coating operations are not included in this total. This is equal to about 21,123 gallons of ROC coating per year. If only zero emission coatings were applied, emissions would be reduced to zero and all 24.65 tons per year of ROC would be eliminated. If a powder coating with a two percent ROC content were used, the reduction would be 24.16 tons per year.

The cost of the proposal is two-fold – the cost of powder coating material and the cost of replacing all liquid ROC coating equipment with powder coating equipment. Cost estimates for the latter appear in an EPA/RTI discussion of powder coating operations.[2]

With respect to material applied, one gallon of ROC-based liquid paint is equal to about 7.4 pounds of powder coating.[3] Based on this information, and the annual liquid coating use noted above (and in Appendix E), the following cost effectiveness is estimated:

(7.4 lb/gal)*(21,123 gal/yr) = 156,310 lb per year of equivalent powder coating material

The cost of powder coating materials ranges from $2.50 to $6.00 per pound, although specialty materials can exceed $25.00 per pound.[2] For this calculation, we assume $4.25 per pound. At this rate, the annual cost of material is:

($4.25/lb)*(156,310 lb/yr) = $664,318 per year

The comparable cost for liquid coating is:

($38.05/gal)*(21,123 gal/yr) = $803,730 per year

Therefore, powder coating materials save a total of $139,412 per year county-wide.

The cost for new powder coating equipment can range from $50,000 for a batch system to $1,000,000 or more for a conveyorized system.[2] The difference between batch and conveyor systems is the amount and size of product that can be processed in a given period of time. For most sources, we assume a small batch operation with a 10 x 10 x 20 ft oven will be used and the following purchases will be necessary:

- Gun & feed system $5,000
- Spray booth $10,000
- Cure oven $30,000
- Pretreatment & cleaning system $10,000

$55,000

There are 46 metal surface coating operations in Ventura County that use liquid coating materials; seven other operations already use powder coating (See Appendix E). If we assume that there are 38 small liquid ROC coating operations in Ventura County that could use the small system, a total of $2,090,000 in capital expenses will be necessary to change all coating systems to powder coating. Eight other operations are larger and make products that may require larger powder coating equipment. If we will assume that, in these cases, the equipment will cost $300,000, the total capital cost for these seven facilities will be $2,400,000. Note that differences in operating costs are <u>not</u> reflected in these calculations; among other things, powder coating requires less energy and less hazardous waste disposal.

Assuming an equipment life of 10 years, the applicable capitol recovery factor applies:

10 years @ 8 percent = 0.149

The capital recovery factor is used to annualize the one-time cost noted above. The county-wide annualized project cost is as follows:

0.149 * $4,490,000 = $669,010 / year

Therefore, the cost-effectiveness of the alternative proposal is:

($669,010/yr)-($139,412/yr) / 24.16 tpy = **$21,920** per ton of ROC reduced.

As noted above, the cost-effectiveness of the proposed revision is:

($3.90/gal)*(9502 gal/yr) / (2.40 ton/yr) = **$15,441** per ton of ROC reduced

On this basis, the annual cost of the proposed revision is:

($3.90/gal)*(9502 gal/yr) = $37,058 per year

Based on the definition, incremental cost-effectiveness is calculated as follows:

$$\frac{\$669,010/yr - \$137,451/yr) - \$37,058}{24.16 - 2.40} = \$22,635$$ per ton of ROC reduced

Incremental cost effectiveness "represents the added cost to achieve an incremental emission reduction between two control options."[4] This estimate is an independent economic assessment and is not related to the maximum absolute cost effectiveness for Best Available Control Technology (BACT) of $18,000

per ton of ROC reduced. Although the capital cost of the alternative control option is relatively high, the potential ROC emission reduction is also high. Note also that some companies may not be able to use powder coating in their particular manufacturing process. However, with better information about processes and costs from stakeholders, the alternative control option may be found to be both feasible and cost-effective.

SOCIOECONOMIC IMPACT

Health and Safety Code, Division 26, Part 3, Chapter 6.5, section 40728.5, which became effective January 1, 1992, requires that the District Board consider the socioeconomic impacts of any new or revised rule. The Board must evaluate the following socio-economic information on proposed Rule 74.12.

(1) *The type of industries or businesses, including small business, affected by the rule or regulation.*

The adoption of these proposed amendments to Rule 74.12 will directly affect facilities that coat metal parts and products. These companies are listed in Appendix A of this report.

(2) *The impact of the rule amendments on employment and the economy of the region.*

Revisions to Rule 74.12 are not expected to have a significant impact on either employment or the economy of Ventura County.

(3) *The range of probable costs, including costs to industry or business, including small business, of the rule or regulation.*

Overall the probable costs range from zero cost for those companies currently in compliance with the proposed amendments to $64,490 per year county-wide for those companies that switch coatings and solvent cleaners.

(4) *The availability and cost-effectiveness of alternatives to the rule or regulation being proposed or amended.*

One alternative control option has been identified; to require the use of a zero-ROC coating such as powder coating. The cost-effectiveness of the option is estimated to be $21,920 per ton of ROC reduced. Although the cost of this option is relatively high, the ROC emission reduction potential is also high. With better information from stakeholders, this option may be both feasible and cost-effective.

(5) *The emission reduction potential of the rule or regulation.*

The anticipated emission reduction potential of the proposed rule is 6.64 tons per year of ROC emissions, a 19 percent reduction. These emission reductions result from the use lower ROC content air-dried coatings and the use of low ROC content cleaning solvents.

(6) *The necessity of adopting, amending, or repealing the rule or regulation in order to attain state and federal ambient air standards pursuant to Chapter 10 (commencing with Section 40910).*

Ventura County is classified as a moderate non-attainment area for federal Ambient Air Quality Standards for ozone. It is classified as a severe non-attainment area for state Ambient Air Quality Standards for ozone. These proposed rule amendments will reduce ROC emissions that are precursors to the formation of ozone. These emission reductions will help the District in its effort to attain both the federal and state ozone standards.

ANALYSIS OF EXISTING FEDERAL AND DISTRICT REGULATIONS

Health and Safety Code Section 40727.2 requires Districts to compare the requirements of a proposed revised rule with other air pollution control requirements. These other air pollution control requirements include federal New Source Performance Standards (NSPS), federal National Emissions Standards for Hazardous Air Pollutants (NESHAPS), Best Available Control Technology (BACT) and any other District rule that applies to the same equipment.

Federal NSPS and NESHAPS

Source to which Rules 74.12 applies include any facility that coats metal parts and products. The existing federal regulation that applies to this source

type is the National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Large Applicances, Metal Furniture, and Miscellaneous Metal Parts. This regulation is being proposed by the U.S. Environmental Protection Agency.

District staff has evaluated the requirements of this federal regulation. We have determined that the proposed requirements of Rule 74.12 are at least as stringent as the federal regulation.

BACT Requirements

Health and Safety Code Section 40727.2 (a) requires that the proposed amendments to Rule 74.12 be compared with Best Available Control Technology. The CAPCOA Engineering Manager Rule Development Subcommittee developed guidance on this matter. Under this guidance, it was recommended that BACT be interpreted as a District's BACT determination.

A check of BACT Determinations made by the South Coast AQMD and ARB revealed a variety of control strategies for the coating of metal parts and products. The appropriate strategy depends on: the type, size, and shape of part; the process line speed; spray booth size and flow rate; and coating performance requirements. Type of control strategies include add-on controls such as thermal oxidation for conveyorized booths, waterborne coatings, high-solid coatings, powder coatings and UV powder coatings.

The BACT requirement for solvent cleaning of spray equipment is determined by SCAQMD Rule 1171. Effective November 7, 2003, the VOC content limit for spray equipment cleaners in Rule 1171 is 25 grams of VOC per liter of solvent (0.21 lb/gal).

ENVIRONMENTAL IMPACTS OF METHODS OF COMPLIANCE / CEQA

California Public Resources Code section 21159 requires the District to perform an environmental analysis of the reasonably foreseeable methods of compliance if the proposed rule requires "the installation of pollution control equipment, or [specifies] a performance standard or treatment requirement..." The proposed revisions to Rule 74.12 specify revised performance standards.

The analysis must include the following information on the proposed revisions to Rule 74.12:

(1) An analysis of the reasonably foreseeable environmental impacts of the methods of compliance.
(2) An analysis of the reasonably foreseeable mitigation measures.
(3) An analysis of the reasonably foreseeable alternative means of compliance with the rule or regulation.

Table 3 lists all reasonably foreseeable compliance methods, the environmental impacts of those methods, and measures that could be used to mitigate the environmental impacts. The analysis indicates that the adoption of amendments to Rule 74.12 will not have a significant effect on the environment.

CEQA Requirements

Staff concludes that adoption of the proposed revisions to Rule 74.12 is within the scope of the categorical exemptions from the California Environmental Quality Act (CEQA) under state CEQA guideline Sections 15307, Protection of Natural Resources, and 15308, Protection of Environment, and that no exceptions to these categorical exemptions apply.

MEETINGS AND COMMENTS

Environmental Protection Agency
August 27, 2007

In a telephone conversation, EPA suggested the addition of a "multi-component coating" definition. A definition of "capture efficiency" was also suggested. These changes were made; see pages 3 and 4 of this report. In addition, EPA also suggested a few minor clarifications to the text.

Public Workshop
August 30, 2007

The public workshop was attended by one stakeholder. No significant changes to the rule were suggested.

Table 3
Environmental Impacts and Mitigations of Methods of Compliance

Compliance Methods (including all reasonably foreseeable alternative means of compliance)	Reasonably Foreseeable Environmental Impacts	Reasonably Foreseeable Mitigation Measures
Reformulation of cleaning solvents	Air Quality Impacts: Reformulation may result in the use of toxic materials.	Operators may use cleaning solvents containing less toxic materials. Also the use of methylene chloride in cleaners is prohibited by the proposal.
	Water Impacts: Improper disposal of cleaning solvents may cause water impacts.	Compliance with wastewater discharge standards and waste disposal requirements will mitigate these impacts.
	Human Health Impacts: Reformulation of cleaning solvents may contain more toxic compounds.	Compliance with OSHA safety guidelines reduces these impacts. Also, methylene chloride, a carcinogen, will be prohibited.
	Flammability Hazard Impacts: The use of acetone in cleaning solvents may increase the likelihood of fire or explosions.	Standard operating practices when dealing with flammable materials will mitigate this hazard. Proper ventilation and avoidance of heat sources or sparks are essential.

Advisory Committee
February 26, 2008

The committee asked about the depletion of non-complying inventory; staff stated that 90 days should be enough time to accomplish the transition to complying compounds. A typographical error was noted in Subsection B.2.e. Staff stated that metal coating operations will be notified of the rule change by mail. The rule revision was unanimously recommended to the Air Pollution Control Board.

REFERENCES

1. Telephone conversation with Ruben Laguna, PCL, 800/752-1566, February 7, 2006

2. *The Coatings Guide*™, RTI International and U.S.EPA Office of Research and Development, The National Risk Management Research Laboratory, October 03 2005, http://cage.rti.org/altern_data.cfm?id=powder&cat=Economics

3. *Powder Coater's Manual*, Roger Talbert, Chapter XI, Section 4, January, 1998, http://www.coatings.de/pcmanual/pcmanual.cfm

4. *Incremental Cost-Effectiveness Guidance Document for Rule Development,* California Air Pollution Control Officers Association, March 26, 1998, page 2

DISCLAIMER

This report contains references to company and product names to illustrate product availability. Mention of these names is not to be considered an endorsement by the Ventura County Air Pollution Control District.

APPENDIX A
Permitted Metal Parts Coating Operations in Ventura County

	Facility Name	Location	SIC Code	SIC Description
1	A-1 Truck & Equipment	Saticoy	7532	Auto Repair & Painting
2	Air National Guard Channel Islands	Port Hueneme	9711	National Security
3	All Valley Wrought Iron	Simi Valley	3499	Fabricated Metal Products
4	Applied Powdercoat	Oxnard	3549	Metalworking Machine Mfg.
5	Artistica Metal Designs	Ventura	2514	Metal Household Furniture
6	B&R Scenery	Camarillo	3999	Mfg. Industries, Other
7	Bell Powder Coating	Ventura	3479	Coating, Engraving, Other
8	Bemco	Simi Valley	3567	Industrial Furnace/Oven Mfg.
9	Bend-Pac	Santa Paula	3542	Machine Tool Mfg.
10	Boeing – Santa Susana	Simi Valley	3764	Rocket Testing
11	C. D. Lyon Construction	Ventura	1799	Paint & Sand / Steam Blasting
12	Chapala Iron & Mfg. Company	Ventura	3446	Ornamental Metal Work Mfg.
13	Clark Engineering Construction	Ventura	1799	Paint & Sand / Steam Blasting
14	Custom Industrial Finishes	Oxnard	3479	Coating, Engraving, Other
15	Custom Iron Designs	Simi Valley	3499	Fabricated Metal Products
16	Data Exchange Corporation	Camarillo	7378	Computer Maintenance & Repair
17	Datron Advanced Tech	Simi Valley	3812	Radar/Sonar System Mfg.
18	Designworks/USA	Newbury Park	7336	Commercial Art/ Graphic Design
19	E. J. Harrison & Sons	Saticoy	7532	Auto Repair & Painting
20	Elite Metal Finishing	Oxnard	3471	Electroplating
21	ERG International	Oxnard	2522	Metal Office Furniture
22	Frias Wrought Iron Works	Ventura	3446	Ornamental Metal Work Mfg.
23	G&H Technology Inc.	Camarillo	3678	Electronic Connectors
24	G.I. Rubbish Company	Simi Valley	7532	Auto Repair & Painting
25	General Magnaplate	Ventura	3471	Electroplating
26	Haas Automation	Oxnard	3549	Metalworking Machine Mfg.
27	Hales Engineering	Camarillo	3499	Fabricated Metal Parts
28	Hanson Lab Furniture	Newbury Park	3821	Lab Apparatus & Furniture
29	Industrial Electric Motors	Oxnard	7694	Motor Rewind Shop
30	Int'l Power DC Power Supplies	Oxnard	3679	Electronic Components – Other
31	Malabar International	Simi Valley	3728	Aircraft Parts/Equip. Mfg.
32	Mares Wrought Iron	Ventura	3446	Ornamental Metal Work Mfg.
33	Metalcrafters	Simi Valley	3499	Fabricated Metal Products
34	Naval Base Ventura Co. – Pt. Mugu	Point Mugu	9711	U.S. Naval Air Station
35	North American Imaging Inc.	Camarillo	5047	Medical / Dental / Hospital Equip.
36	Oilfield Electric Company	Ventura	7694	Motor Rewind Shop
37	Original 22	Camarillo	2599	Furniture/Fixtures, Other
38	Oxnard Public Works Equip. Yard	Oxnard	9111	Government Agency
39	Pentair Pool Products	Moorpark	3648	Lighting Equipment, Other
40	Power Machinery Center	Oxnard	7359	Equipment Rental & Leasing
41	Raypak	Oxnard	3433	Swimming Pool Heater Mfg.
42	Royal Coatings	Simi Valley	3479	Coating, Engraving, Other
43	Smith Precision Products	Newbury Park	3569	Industrial Machinery Mfg.
44	Southern California Gold Products	Oxnard	3549	Metalworking Machine Mfg.
45	Sun Welding	Simi Valley	3499	Fabricated Metal Products
46	T&T Truck & Crane	Ventura	1389	Oilfield Services
47	Trumeta Corporation	Camarillo	3446	Ornamental Metal Work Mfg.
48	Ventura Co. – Facilities & Grounds	Ventura	9111	Government Agency
49	Vista Landscape Lighting	Simi Valley	3499	Fabricated Metal Products
50	Vogue Sign Company	Oxnard	3479	Coating/Engraving, Other
51	Waterpik Technologies	Moorpark	3433	Swimming Pool Heater Mfg.
52	Weatherford Oil Country	Ventura	3499	Fabricated Metal Products
53	Weatherford U.S., L.P.	Santa Paula	1389	Oilfield Services

APPENDIX B

Metal Surface Coating Operations
Requiring ROC Reductions - Solvent

Solvent Use and Emission Reduction Estimates

Facility #		Permit gal/yr	Average gal/yr	Actual lb/gal	New Rule lb/gal	Difference lb/gal	Difference ton/yr
173	Oilfield Electric Company	70	38.40	4.00	0.21	3.79	0.07
207	A-1 Truck & Equipment	*	503.80	6.52	0.21	6.31	1.59
596	Malabar International**	*	-	-	0.21	-	-
636	Trumeta Corporation**	*	-	-	0.21	-	-
712	Royal Coatings	100	91.14	6.76	0.21	6.55	0.30
719	T & T Truck & Crane Service	*	26.86	4.00	0.21	3.79	0.05
841	Vogue Sign Company	120	2.80	0.50	0.21	0.29	0.00
868	Chapala Iron & Mfg. Company	36	5.00	4.41	0.21	4.20	0.01
1113	Designworks/USA	15	19.38	4.29	0.21	4.08	0.04
1174	Hanson Lab Furniture	250	46.19	6.77	0.21	6.56	0.15
1230	North American Imaging Inc.	125	25.76	6.57	0.21	6.36	0.08
1308	Power Machinery Center	100	5.11	6.50	0.21	6.29	0.02
1321	G & H Technology Inc.	138.6	12.26	2.91	0.21	2.70	0.02
1335	Artistic Distribution Enamel	150	113.63	4.46	0.21	4.25	0.24
7221	C.D. Lyon Construction Inc.	350	137.17	6.70	0.21	6.49	0.45
7221	C.D. Lyon Construction Inc.	55	16.20	4.00	0.21	3.79	0.03
7297	Weatherford Oil County	350	348.55	6.77	0.21	6.56	1.14
7392	Hales Engineering	350	120.50	0.40	0.21	0.19	0.01
7431	Elite Metal Finishing	10	10.82	6.77	0.21	6.56	0.04
			1523.54			4.63	**4.24**
			Total gal/yr			Average Reduction	Total Reduction

* - Permitted solvent limit combined with coating limit

** - No actual use data

APPENDIX C

Metal Surface Coating Operations
Requiring ROC Reductions - Coatings
Coating Use and Emission Reduction Estimates

Coating Use and Emission Reduction Estimates

Facility #		Mix	Permit gal/yr	Average gal/yr	Actual lb/gal	New Rule lb/gal	Difference lb/gal	Difference ton/yr
103	Custom Industrial Finishes	1	1785	1173.12	2.56	2.3	0.26	0.15
173	Oilfield Electric Company	1	830	385.72	3.15	2.3	0.85	0.16
207	A-1 Truck & Equipment	1	1941	928.18	2.57	2.3	0.27	0.12
339	General Magnaplate	1	111	15.88	4.55	2.3	2.25	0.02
596	Malabar Int'l	1	2760 lb	357.32	3.98	2.3	1.68	0.30
605	Sun Welding	2	1412	524.46	3.50	2.8	0.70	0.18
629	Air Nat'l Guard-Channel Island	1	125	36.17	3.50	2.3	1.20	0.02
629	Air Nat'l Guard-Channel Island	1	75	5.70	2.84	2.3	0.54	0.00
636	Trumeta Corporation	1	6000 lb	1432.58	2.46	2.3	0.16	0.11
712	Royal Coatings	1	1500	275.86	2.80	2.3	0.50	0.07
825	Intl Power DC Power Supplies	1	445	36.67	2.41	2.3	0.11	0.00
841	Vogue Sign Company	1	500	50.09	2.60	2.3	0.30	0.01
1113	Designworks/USA	1	82	62.30	3.85	2.3	1.55	0.05
1308	Power Machinery Center	1	500	47.38	2.80	2.3	0.50	0.01
1321	G & H Technology Inc.	1	76.5	4.80	7.03	2.3	4.73	0.01
7086	G.I. Rubbish Company	1	3065	2365.79	2.80	2.3	0.50	0.59
7086	G.I. Rubbish Company	1	400	324.63	3.50	2.3	1.20	0.19
7232	Weatherford U.S., L.P.	1	300	83.50	2.83	2.3	0.53	0.02
7336	Custom Iron Designs	1	2500	887.57	2.83	2.3	0.53	0.24
7392	Hales Engineering	1	750	233.54	2.84	2.3	0.54	0.06
7417	Applied Powdercoat, Inc.	1	200	200.00	2.80	2.3	0.50	0.05
7431	Elite Metal Finishing	1	695	71.17	2.84	2.3	0.54	0.02
				9502.43 Total gal/yr			0.91 Average Reduction	**2.40** Total Reduction

APPENDIX D

Partial List of Available Complying Coatings

Mfgr	Brand	Series		Description			Applied Over	lb/gal	g/l
Ameron	Amercoat	148		Waterborne Acrylic	Primer	Flat, off white	Steel	1.61	193
Ameron	Amercoat	220		Waterborne Acrylic	Topcoat	Semigloss, colors	Steel, concrete, wood, aluminum, dry wall	1.50	180
Ameron	Amercoat	222		Waterborne Acrylic	Topcoat	Semigloss, colors	Prepared Steel	1.00	117
Ameron	Amercoat	5105		Alkyd Primer, corrosion resistant	Primer	Flat, gray white red	Steel	2.33	280
Carboline	Carbocrylic	120		Waterborne Acrylic Bonding	Primer	Satin, white	Steel, Aluminum, PVC, FRP, Tile	0.82	98
Carboline	Carbocrylic	3358		Waterborne Acrylic w/ corrosion	Primer	Eggshell, salmon, buff	Direct-to-metal	1.28	153
Carboline	Carbocrylic	3359		Waterborne Acrylic	Topcoat	Semigloss, colors	Various surfaces	1.10	132
Carboline	Metal Prep P			Phosphatizing Solution	Primer	Clear	Metal	1.03	123
Carboline	Carbothane	133	VOC	Aliphatic Acrylic Polyurethane	Finish	Satin, colors	Primers or intermediates	1.31	157
Carboline	Carbothane	134	HG	Aliphatic Acrylic Polyurethane	Finish	Gloss, colors	Primer, various surfaces	2.20	264
Carboline	Carbothane	134	VOC	Aliphatic Acrylic Polyurethane	Finish	Gloss, colors	Primer, various surfaces	1.58	190
Cardinal		3600		Waterborne Acrylic Enamel	Topcoat	Gloss, semi-g, colors	Steel, aluminum, plastic	2.30	275
Cardinal		3700		Waterborne Acrylic for Plastic	Finish	Gloss, semi-g, colors	Plastic, wood, metal	2.10	252
Cardinal		4000		Water Reducible Alkyd Enamel	Topcoat	Semigloss, colors	Metal	2.30	275
Cardinal		8100		Waterborne Acrylic Baking Enamel	Finish	Gloss, semi-g, colors	Metal	1.86	
Devoe	Devflex	4020	PF	Waterborne Acrylic	Primer/Finish	Flat, white, red	Steel, masonry	0.76	91
Devoe	Devflex	4205		Acrylic Latex Enamel	Topcoat	Semigloss, colors	Wood, metal, masonry	1.91	229
Devoe	Devflex	4206	QD	Waterbome Acrylic Enamel	Topcoat	Semigloss, colors	Wood, metal, masonry	1.59	190
Devoe	Devflex	4208	QD	Waterbome Acrylic Enamel	Topcoat	Gloss, colors	Wood, metal, masonry	1.71	205
Sherwin-Williams	B53-300 Series	2.35		Waterbased Acrylic-modified alkyd	Topcoat	Gloss, colors	Steel, concrete,aluminum	1.67	200
Sherwin-Williams	Kem Aqua	600		Water Reducible Enamel	Topcoat	Low Gloss, black white clear	Plastic, wood, metal	2.30	276
Sherwin-Williams	Kem Aqua	600	T	Water Reducible Enamel	Topcoat	Gloss, black white clear	Plastic, wood, metal	2.30	276

APPENDIX D

Partial List of Available Complying Coatings (con't)

Mfgr	Brand	Series		Description			Applied Over	lb/gal	g/l
Sherwin-Williams	Polane	700T		Water Reducible Enamel polyurethane acrylic	Topcoat	Gloss, black white clear	Plastic, wood, metal	2.30	276
Sherwin-Williams	Polane		W2	Acrylic Latex	Primer	Flat, gray	Plastic, metal	2.30	276
Sherwin-Williams	Steel Spec	2.3		Weld-thru w/rust inhibitor	Primer	Flat, red, gray	Structural Steel	2.30	276
Tnemec	Tneme-Cryl	6		Waterborne Acrylic Emulsion	Finish	Matte, colors	Wood, metal, masonry	1.44	172
Tnemec	HydroPlate	35		Self-crosslinking hydrophobic Acrylic	Finish	Semi-gloss, colors	Exterior steel, structures	1.24	148
Tnemec	Spra-Sef EN	30		Hydrophobic Acrylic Polymer	Finish	Satin, colors	HD Metal protection	1.60	192
Tnemec	Tufcryl	28		Waterbased Acrylic Polymer	Finish	Gloss, colors	Wood, metal, masonry	1.59	190
Tnemec	Tufcryl	29		Waterbased Acrylic Polymer	Finish	Semi-gloss, colors	Wood, metal, masonry	1.59	190
Tnemec	Uni-Bond DF	115		Self-crosslinking hydrophobic Acrylic	Primer	Eggshell, colors	Steel, aluminum, others	1.17	140

APPENDIX E

Metal Surface Coating Operations in Ventura County

Summary of Calculation Results

	Metal Surface Coating		Permitted		Actual Average		Actual		New	Diff	Coating	Solvent
	Facility		gal/yr	lb/yr	gal/yr	lb/yr	lb/gal	ton/yr	lb/gal	lb/gal	ton/yr	ton/yr
103	Custom Industrial Finishes	Coatings	1785		1173.12		2.56	1.50	2.3	0.26	0.15	
103		Solvent	500		211.39				0.21			
173	Oilfield Electric Company	Coatings	830		385.72		3.15	0.61	2.3	0.85	0.16	
173		Solvent	70		38.40		4.00	0.08	0.21	3.79		0.07
180	Clark Engineering Construction	Coatings	200		179.82		2.21	0.20	2.8			
180		Coatings	200		165.26		2.63	0.22	2.8			
180		Solvent	300		122.58				0.21			
196	Original 22	Coatings	1050		316.75		2.08	0.33	2.3			
196		Coatings	7000		231.66		0.12	0.01	2.3			
196		Coatings	12000		177.46		1.57	0.14	2.3			
196		Solvent	60		46.85				0.21			
203	Waterpik Technologies	Powder		100000		71531.43	0.02	0.72	2.3			
207	A-1 Truck & Equipment	Coatings	1941		928.18		2.57	1.19	2.3	0.27	0.12	
207		Solvent			503.80		6.52	1.64	0.21	6.31		1.59
232	Boeing - Santa Susana	Coatings		11188					2.3			
242	Industrial Electric Motors	Coatings		4752.5	125.29		2.08	0.06	2.3			
339	General Magnaplate	Coatings	111		15.88		4.55	0.04	2.3	2.25	0.02	
339		Solvent	195		24.35		0.01	0.00	0.21			
464	Pentair Pool Products	Powder		50500		10387.00	0.01	0.05				
505	Bend-Pak Inc.	Coatings	4100		2557.31		2.00	2.56	2.8			
505		Solvent	193		117.65		0.21		0.21			
522	Datron Advanced Tech	Coatings	1000		12.85				2.3			
522		Solvent	225		9.70				0.21			
530	B&R Scenery	Coatings	1300		112.00		2.29	0.13	2.3			
530		Solvent			No Data				0.21			
596	Malabar Int'l	Coatings		2760	357.32		3.98	0.71	2.3	1.68	0.30	
596		Solvent			No Data				0.21			
605	Sun Welding	Coatings	1412		524.46		3.50	0.92	2.8	0.7	0.18	
605		Solvent	400		68.80				0.21			
628	Ventura Co-Facilities & Ground	Coatings	40		No Data				2.3			
628		Solvent	80		No Data				0.21			
629	Air Nat'l Guard-Channel Island	Coatings	125		36.17		3.50	0.06	2.3	1.2	0.02	
629		Coatings	75		5.70		2.84	0.01	2.3	0.54	0.00	
629		Solvent	700		50.00		0.01	0.00	0.21			
634	Frias Wrought Iron Works	Coatings	1250		No Data							
634		Solvent	50		No Data							
636	Trumeta Corporation	Coatings		6000	1432.58		2.46	1.76	2.3	0.16	0.11	
636		Solvent			No Data				0.21			

APPENDIX E

Metal Surface Coating Operations in Ventura County (Con't)

	Metal Surface Coating Facility		Permitted gal/yr	Permitted lb/yr	Actual Average gal/yr	Actual Average lb/yr	Actual lb/gal	Actual ton/yr	New lb/gal	Diff lb/gal	Coating ton/yr	Solvent ton/yr
650	Data Exchange Corporation	Coatings		2132	463.18	165.42	2.80	0.08	2.8			
650		Solvent	60		32.50				0.21			
651	ERG International	Powder		36800		5493.57	0.05	2.75	2.3			
651		Solvent	240		88.29		0.20	0.01	0.21			
688	Bemco Inc.	Coatings	250		107.14		0.85	0.05	2.3			
688		Coatings	250		79.43		0.75	0.03	2.3			
694	Weatherford U.S., L.P.	Coatings	1545		143.22		1.04	0.07	2.3			
712	Royal Coatings	Coatings	1500		275.86		2.80	0.39	2.3	0.5	0.07	
712		Coatings			429.21		1.67	0.36	2.3			
712		Solvent	100		91.14		6.76	0.31	0.21	6.55		0.30
719	T & T Truck & Crane Service	Coatings	450		123.00		2.22	0.14	2.3			
719		Solvent			26.86		4.00	0.05	0.21	3.79		0.05
825	Intl Power DC Power Supplies	Coatings	445		36.67		2.41	0.04	2.3	0.11	0.00	
841	Vogue Sign Company	Coatings	500		50.09		2.60	0.07	2.3	0.3	0.01	
841		Solvent	60		15.56				0.21			
841		Solvent	120		2.80		0.50	0.00	0.21	0.29		0.00
855	Oxnard Public Works Equip.Yard	Coatings	1242		65.91		2.08	0.07	2.3			
855		Solvent							0.21			
868	Chapala Iron & Mfg. Company	Coatings	2750		224.75		1.86	0.21	2.3			
868		Solvent	36		5.00		4.41	0.01	0.21	4.2		0.01
997	Naval Base VC - Pt. Mugu	Coatings	1016									
997		Solvent	118						0.21			
1024	Smith Precision Products	Coatings	75		40.39		2.08		2.3			
1024		Solvent	50						0.21			
1113	Designworks/USA	Coatings	82		62.30		3.85	0.12	2.3	1.55	0.05	
1113		Solvent	15		19.38		4.29	0.04	0.21	4.08		0.04
1174	Hanson Lab Furniture	Coatings	5000		579.03		0.80	0.23	2.3			
1174		Powder		100000		11163.36	0.01	0.06	2.3			
1174		Solvent	250		46.19		6.77	0.16	0.21	6.56		0.15
1224	Metalcrafters	No Data			No Data							
1230	North American Imaging Inc.	Coatings	125		38.00		2.30	0.04	2.3			
1230		Solvent	125		25.76		6.57	0.08	0.21	6.36		0.08
1308	Power Machinery Center	Coatings	500		47.38		2.80	0.07	2.3	0.5	0.01	
1308		Solvent	100		5.11		6.50	0.02	0.21	6.29		0.02
1321	G & H Technology Inc.	Coatings	76.5		4.80		7.03	0.02	2.3	4.73	0.01	
1321		Solvent	138.6		12.26		2.91	0.02	0.21	2.7		0.02

APPENDIX E

Metal Surface Coating Operations in Ventura County (Con't)

	Metal Surface Coating Facility		Permitted gal/yr	Permitted lb/yr	Actual Average gal/yr	Actual Average lb/yr	Actual lb/gal	Actual ton/yr	New lb/gal	Diff lb/gal	Coating ton/yr	Solvent ton/yr
1335	Artistica Metal Designs	Coatings	3500		445.39		2.00	0.45	2.3			
1335		Coatings	1000		737.25		2.09	0.77	2.3			
1335		Coatings	1694		546.25		2.09	0.57	2.3			
1335		Coatings	200		136.66		1.25	0.09	2.3			
1335		Solvent	150		113.63		4.46	0.25	0.21	4.25		0.24
1368	Bell Powder Coating	Powder		75000		50142.86	0.03	0.75	2.3			
7009	E. J. Harrison & Sons, Inc.	No Data			No Data							
7086	G.I. Rubbish Company	Coatings	3065		2365.79		2.80	3.31	2.3	0.5	0.59	
7086		Coatings	400		324.63		3.50	0.57	2.3	1.2	0.19	
7221	C.D. Lyon Construction Inc.	Coatings	1445		943.17		2.20	1.04	2.3			
7221		Solvent	350		137.17		6.70	0.46	0.21	6.49		0.45
7221		Solvent	55		16.20		4.00	0.03	0.21	3.79		0.03
7226	Haas Automation	Coatings		19400	1683.0952	4712.67	2.80	2.35	2.8			
7232	Vista Landscape Lighting	Powder		295000		49330.50	0.03	0.74	2.3			
7232		Coatings	300		83.50		2.83	0.12	2.3	0.53	0.02	
7251	Southern California Gold Products	Powder		330000		52052.79	0.01	0.26	2.3			
7297	Weatherford Oil County	Coatings	1600		868.50		2.10	0.91	2.3			
7297		Solvent	350		348.55		6.77	1.18	0.21	6.56		1.14
7304	All Valley Wrought Iron	Coatings	300		29.43		2.22	0.03	2.3			
7305	Mares Wrought Iron	Coatings	125		51.13		2.29	0.06	2.3			
7336	Custom Iron Designs	Coatings	2500		887.57		2.83	1.26	2.3	0.53	0.24	
7354	Veeco Slider Process Equipment	Coatings			8.50		NoData					
7371	Raypak, Inc.	Powder		396000		91828.75	0.01	0.23	2.3			
7392	Hales Engineering	Coatings	750		233.54		2.84	0.33	2.3	0.54	0.06	
7392		Solvent	350		120.50		0.40	0.02	0.21	0.19		0.01
7417	Applied Powdercoat, Inc.	Coatings	200		200.00		2.80	0.28	2.3	0.5	0.05	
7431	Elite Metal Finishing	Coatings	695		71.17		2.84	0.10	2.3	0.54	0.02	
7431		Solvent	10		10.82		6.77	0.04	0.21	6.56		0.04
								34.61			**2.40**	**4.24**
											ROC Reduction	
		Solvent			2311.22			4.40			Coating	Solvent
		Coatings			21123.45			24.65				
	(Coating equivalent = 7.4 lb/gal)	Powder			46206.79	341930.25		5.55	30.20	Coating Only		
				Sum	67330.24			34.61				

APPENDIX F
General Discussion of Metal Coating Technology

Paints and coatings are made of materials that fall into the following four principal classes: pigments, solvents, binders, and additives. Pigments are finely divided solids of various shades used to give color, hiding, consistency, build, durability, and other properties to coatings. Binders, also called film formers, are oils, resins and plasticizers that go to make up the protective films. The solvents are the liquids added to most surface coatings to make them fluid enough for proper application. Solvents evaporate to leave a residue of pigment and binder to form the protective and decorative films by various drying and hardening processes. Solvents are also used for preparing the surfaces of various substrates and for cleanup. Finally, additives help to improve the performance characteristics in various ways. Additives may be driers, skinning inhibitors, biocides (including pesticides used as antifoulants) or wetting agents.

The solvents used in the coating of metal parts and cleaning of spray equipment are the primary source of ROC emissions. These solvents evaporate releasing organic compounds to the atmosphere. The organic compounds photochemically react with oxides of nitrogen when exposed to ultraviolet radiation from sunlight to produce ozone.

Coating Technology

Today's metal coatings are formulated with several resin systems that provide excellent durability and performance. Acrylics, polyurethanes, epoxies, polyesters, silicones, siloxanes, acrylates, and a variety of hybrids represent the majority of existing coating technologies. There are two ways to reduce coating emissions; either increase the solid content (resins and pigments) or replace the ROC solvent with water or exempt solvents. High-solids, multi-component, and Ultra-Violet (UV) curable coatings are in the former category, while waterborne and acetone-based coatings are in the second category. Most users have reduced solvent emissions by using either high solids, waterborne, or powder coatings.

High-Solids Coatings

High-solids coatings generally fall into the two-component air-dried category or the one-component heat-cured systems. An example of a new technology in the two-component, high-solids coatings is the engineered siloxane coatings from Ameron International. These air-dried two-component coatings (80 to 90 percent volume solids) can be applied by brush, roller, or spray without thinning. The ROC content of this coating is 120 gram per liter and is a high-gloss, self-priming topcoat. This PSX resin from Ameron is the world's first weatherable epoxy and contains the properties of both a high performance epoxy and an acrylic polyurethane in one coat. This coating has outstanding resistance to acid, corrosion, high humidity, and moisture.

Another example of the new resin technology for high-solids coatings is Lyondell's ACRYFLOW P120 liquid acrylic polyol. High performance coatings can be formulated with this resin and be sprayable at 2.1 pounds ROC per gallon. This resin provides improved crosslinking properties without increasing isocyanate demand, which leads to improved hardness, chemical resistance, durability and appearance at lower cost. Urethane coatings using this resin can have longer pot lives, which increases user process flexibility. Conversely, these coatings can also be formulated to dry quickly, another important cost and time saver.

Waterborne Coatings

Waterborne coatings reduce emissions simply because the solvent used is water. Almost all waterbornes contain some organic co-solvents or additives to provide added coating performance. Waterbornes can be formulated with many different resin systems: acrylics, epoxies, phenolic resins, polyamides and polyester. An example of the new waterborne coatings is DEVFLEX 4208QD from ICI Devoe Industrial Coatings. This is a premium quality waterborne acrylic gloss enamel. This coating features alkyd-like hardness and durability, exceptional adhesion, superior flow and leveling, fast dry, easy application, excellent gloss and color retention, low odor, and high hiding. The ROC content of this coating is about 205 grams per liter.

Powder Coatings

Powder coatings have long been used to coat metal parts because it is an efficient, no ROC, single-coat process that provides a high-quality, durable finish. Powder coatings offer the best way to reduce ROC emissions because they are 100% solids with very low emissions. Thermoplastic powders are applied to heated parts and immediately fuse to the metal substrate. Polyethylene, polypropylene, nylon, polyvinyl chloride, and polyester are commonly used thermoplastic resins. These are primarily functional

coatings rather than decorative because they are applied at many mils thickness.

Thermoset powder coatings are principally used for decorative purposes and are applied from 1 to 3 mils thick. Epoxy, polyester and acrylic powder are the most common thermoset powders. They are used for shelving, bathroom fixtures, office and kitchen furniture, business machines and home appliances.

Epoxy resins do not perform well outdoors because they may chalk when exposed to ultraviolet light. Hybrid resins of epoxy and polyester provide greater performance and easier application characteristics. Dow Chemical has developed new epoxy resin for powder coatings that have low-temperature (110^{o}C) and improved flow, high temperature resistance and maximum transparency in clear epoxy powder coatings. Low-temperature cure powders may be used for pre-assembled metal parts and plastic substrates. Improved flow allows use for decorative purposes with a smooth surface for application on metal shelving, file cabinets, appliances, furniture and general metal parts.

Acrylic powders have an exterior durability similar to their liquid counterparts and may be used for heavy machinery, appliance exteriors and aluminum extrusions. Polyester and polyester triglycidylisocyanurate hybrid powders also have exterior uses such as aluminum and steel wheels and outdoor furniture.

Use of powder coatings is a well-developed technology that has been used for the past 30 years and provides one of the most durable finishes available. Many types of parts are commonly powder-coated, including lawn and garden, appliance, and automotive. Recent developments include low-temperature cure of 250^{o} F versus 300 to 400 ^{o}F for standard powders. Total annual sales of powder finishes in North America is about $1 Billion, approximately 10 percent of the total industrial finishes market. Other advances include metallic finishes and new application equipment that make color changes faster and easier.

Ultraviolet-Cured Powder Coatings

Ultraviolet (UV) curable coatings, inks, and adhesives have been used in a variety of industrial applications for more than 30 years; these include beverage cans, printing inks, overprint varnishes. UV curable powder coatings now make it possible to powder coat parts such as medium density fiberboard, plastics and preassembled and diecast metal parts. Plastics are difficult to powder coat because they are both heat sensitive and nonconductive. Additionally, galvanized and electroplated substrates that either outgas or are temperature sensitive can now be power coated without coating defects.

UV powder coatings may also be a better option for massive metal parts, such as engine blocks, iron light pole bases, and I-beams that act as heat sinks during processing. With a traditional powder coating, the part surface must remain at high temperature to ensure adequate curing. A massive metal part absorbs the heat, which results in high-energy costs and long dwell and cool-down times. Since UV powder is not heat activated, both the oven temperature and dwell times can be reduced. This offers finishers new options and traditional powder coatings an ability to expand their market.

UV coatings consist of monomers, oligomers, photoinitiators and additives. They exist in the acrylate chemical family as epoxy, urethane or polyester hybrids. Photoinitiators absorb UV or near Infra-Red light and generate free radicals that react with double bonds causing polymerization. So, one advantage is that the melt and flow step can be separated from the curing step, allowing superior flow out and leveling of the coating prior to crosslinking. Most UV powders melt and flow in infrared, convection or IR/convection ovens at 175^{o}F to 250^{o}F for 2 to 10 minutes and cure in a UV oven in a matter of seconds.

Application to variable geometries were difficult before three-dimensional curing equipment became available. In addition, heavily pigmented UV coatings that have outstanding opacity at low film loadings are available. Both textured and smooth coatings are available in a variety of colors, though not as many as traditional powders. Typical UV curing is a very fast, low temperature process that requires little floor space and produces high-quality coatings. Thus, with a UV powder, you get high material utilization, no ROCs, increased productivity, low-temperature curing and a high-quality coating. Compared to low-temperature thermal cure powders, UV powders provide a more durable finish, more flexibility and faster line processing.

UV powders currently cost several times more than traditional powder coatings. But, costs are expected to drop as production volume increases. High material utilization, reduced floor space, increased line speeds will reduce costs in addition to reduced labor and energy costs.