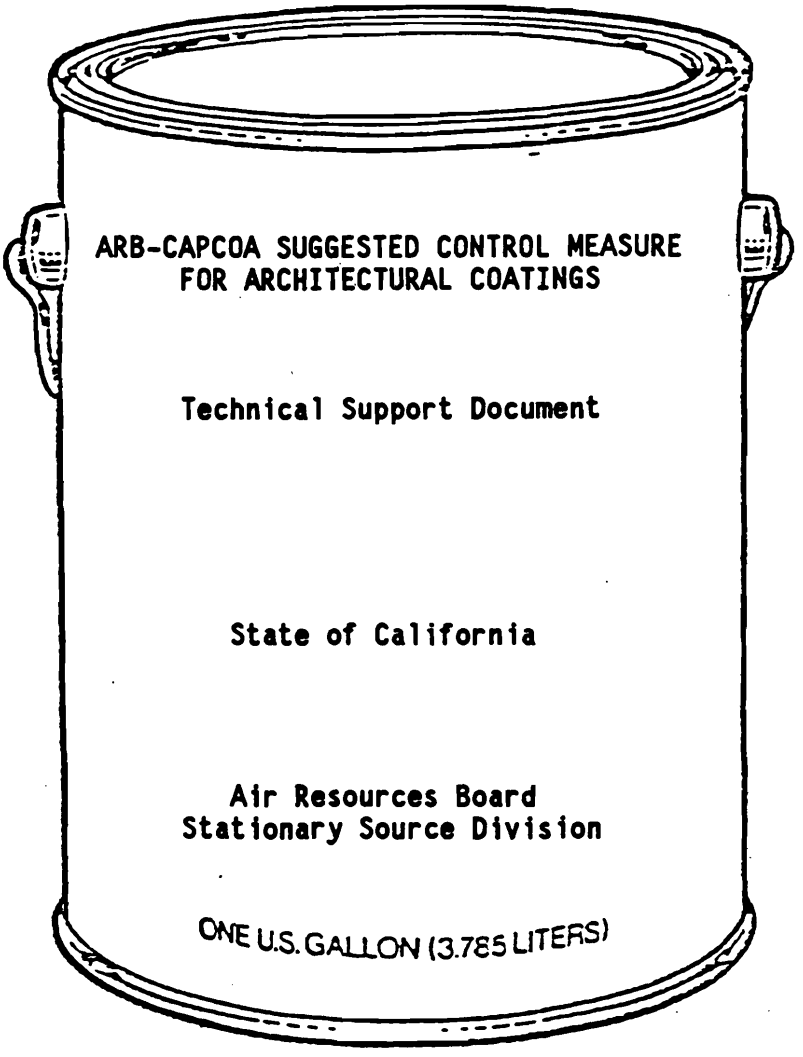
ARB-CAPCOA SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Technical Support Document

State of California

Air Resources Board
Stationary Source Division

July 1989



ARB-CAPCOA SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Technical Support Document

State of California

Air Resources Board
Stationary Source Division

July 1989

ARB-CAPCOA SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Prepared by

Technical Review Group
Architectural Coatings Committee

and

Solvent Control Section
Air Resources Board

Reviewed by

Peter D. Venturini, Chief, Stationary Source Division
Ronald A. Friesen, Assistant Chief, Stationary Source Division
Dean C. Simeroth, Chief, Criteria Pollutants Branch
Dan Donohoue, Manager, Solvents Control Section

Stationary Source Division
Air Resources Board

July 1989

ARB-CAPCOA SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Technical Support Document

Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

This report has been prepared by the staff of the California Air Resources Board in cooperation with the Statewide Technical Review Group. Publication does not signify that the contents reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

ACKNOWLEDGMENTS

This report and suggested control measure were developed by the Air Resources Board staff in cooperation with the Technical Review Group's Architectural Coating Committee and with the participation of industry representatives. We would particularly like to thank:

Technical Review Group

Architectural Coatings Committee

Dan Donohoue, Chairman	ARB
John Ungvarsky	EPA - Region IX
Don Hopps	South Coast AQMD
Wayne Kino	Bay Area AQMD
Stan Cowen	Ventura County APCD
Ben Hancock	San Diego County APCD

Air Resources Board Staff

Linda Clark	Paul Milkey
Tom Evashenk	Ed Wong
David Faulkner	Peggy Vanicek
Marline Hicks	Floyd Vergara

The Environmental, Legislative, and Regulatory Advisory Program (EL RAP) of the Southern California Paint and Coatings Association for facilitating discussion among industry and governmental representatives.

Table of Contents

Page

Acknowledgments....4

Introduction and Recommendations....8

I. Emission Estimates and Rule Status....12

A. Solvents Used in Architectural Coatings....12

B. Emission Estimates....13

C. Rule Status....15

II. Summary of The Suggested Control Measure....16

III. Impacts Assessment....20

A. Emission Reductions....20

B. Economic Impacts....22

IV. Rule Effectiveness Issues....26

A. Economic Incentives....26

B. Surveys....27

C. Technology Forcing Standards....28

V. Options for Future Emission Reductions....30

VI. Environmental Impacts....32

VII. Discussion of The Suggested Control Measure....34

A. Definitions/Standards Proposals....34

B. Administrative Requirements....66

References

Appendixes

A. ARB-CAPCOA Suggested Control Measure for Architectural Coatings....82

B. Workshop Announcements....83

List of Tables

		Page
1	Architectural Coatings - Specialty Coating Categories	9
2	Architectural Coating Rules in California Air Pollution Control/Air Quality Management Districts as of April 1989	15
3	Definitions to be Amended, Deleted or Added to the Suggested Control Measure	17
4	Summary of Proposed Changes to VOC Standards	18
5	Summary of Administrative Proposals	19
6	Estimated Statewide Emission Reductions	21
7	1984 Market Survey for Proposed Changes to Architectural Coatings Model Rule	23
8	Factors to Consider for Cost-Analyses	24
9	Cost-Analyses for Various Coatings Types	25
10	Options for Future Emission Reductions	31
11	350 g/l Compliant Primers, Sealers and Undercoaters	55
12	250 g/l Compliant Enamels	59

List of Figures

		Page
1	Solvent Use Categories and Associated Emissions	13
2	Architectural Coating Categories and Associated Emissions	14
3	Specialty Architectural Coatings and Associated Emissions	14

INTRODUCTION

The purpose of this report is to present the suggested control measure for emissions of volatile organic compounds (VOC) released from the application of architectural coatings. This Suggested Control Measure was developed by the Technical Review Group's (TRG) Architectural Coating Committee and consists of amendments to the 1985 architectural coating model rule. The original model rule was approved by the Air Resources Board in 1977 and revised by the TRG in 1985.

The Architectural Coating Committee was formed by the Technical Review Group in 1986. It includes representatives of the Air Resources Board, the Bay Area Air Quality Management District, the South Coast Air Quality Management District, the San Diego County Air Pollution Control District, the Ventura County Air Pollution Control District, and the United States Environmental Protection Agency. The committee was charged with revisiting the model rule to:

- improve the clarity and enforceability of architectural coatings rules;
- provide a basis for uniformity among architectural coating rules in California;
- encourage the use of lower VOC coatings by regulating the solvent content of architectural coatings based upon their end use;
- encourage the development of new technology or practices which might yield a reduction in overall emissions from architectural coatings; and
- reduce emissions by taking advantage of new coating technologies especially in exempt coating categories.

To meet these objectives, the committee investigated the availability, VOC content and performance of coatings for a number of architectural applications. The committee has consulted in person and by telephone with industry representatives, including resin suppliers, coating manufacturers and applicators to obtain additional information.

The principal focus of the committee's investigations was the exempt specialty coatings and other specialty coatings with high VOC limits in the rules. Table 1 lists the specialty coatings categories which were reviewed by the committee. Specialty coatings account for about 70 percent of the VOC emissions from architectural coatings. The Committee did not consider any changes to the flat and non-flat coatings which account for the remaining 30 percent of the VOC emissions. In all the districts with an architectural coatings rule, flat and non-flat coatings have been at 250 grams of VOC per liter (g/l) for two years. Flat and non-flat coatings are generally low-VOC water borne coatings.

As such, additional emission reductions from these coatings are not possible at this time.

Table 1

Architectural Coatings
Specialty Coating Categories

Below Ground Wood Preservatives	Primers, Sealers and Undercoaters
Bond Breakers	Quick-Dry Enamels
Clear Wood Finishes	Quick-Dry Primers, Sealers and Undercoaters
Concrete Curing Compounds	Roof Coatings
Dry Fog Coatings	Semi-Transparent Stains
Fire Retardant Coatings	Shellac
Form Release Compounds	Specialty Flat
Graphic Arts Coatings	Swimming Pool Coatings
Industrial Maintenance	Tile-Like Glaze
Magnesite Cement Coatings	Traffic Paints
Mastic Textured Coatings	Waterproofing Sealers
Metallic Pigmented Coatings	Wood Preservatives
Multi-Colored Coatings	
Opaque Stains	
Pre-Treatment Wash Primers	

To provide adequate opportunity for industry and public participation, the committee conducted three public workshops. The first workshop was held in San Francisco on November 9, 1988, the second in Los Angeles on January 9, 1989 and the last in Sacramento on February 24, 1989. The committee sent workshop notices to over 500 people. More than 400 people attended the workshops, including representatives of coating manufacturers and trade associations (eg. The National Paint and Coatings Association, The Southern California Paint and Coatings Association, The California Building Industry Association).

Based on the information received from workshop participants and the committee's own research, the committee has proposed this suggested control measure as amendments to the TRG's 1985 architectural coating model rule. The Air Resources Board approved the suggested control

measure with amendments on May 12, 1989. The TRG approved the amended suggested control measure on May 24, making it the "ARB-CAPCOA Suggested Control Measure for Architectural Coatings" (SCM).

This report is divided into seven sections. Section I describes the current VOC emissions from architectural coatings and presents a brief summary of the district's architectural coating rules. Section II summarizes the proposed changes to the 1985 model rule. Section III describes the estimated emission reductions from implementation of the suggested control measure and its economic impacts. Section IV discusses three rule-effectiveness issues: economic incentives, limits that force technology beyond what is now achievable, and surveys to assess the progress engendered by the rule. Section V identifies areas where additional emission reductions may be achieved from architectural coatings over the next three to seven years. Section VI presents a discussion of the environmental impacts of the proposed changes. Section VII describes the TRG's proposed changes to the architectural coatings rules, the basis for the proposed changes, and issues associated with them.

Appendix A to this report is the ARB-CAPCOA Suggested Control Measure for Architectural Coatings, as approved by the Air Resources Board and the TRG. Copies of the workshop notices are included in Appendix B.

RECOMMENDATIONS

The Technical Review Group and the Air Resources Board both strongly recommend that districts adopt architectural coatings rules based closely on the ARB-CAPCOA Suggested Control Measure for Architectural Coatings. The Air Resources Board has directed its staff to work with the Technical Review Group and the districts to ensure timely adoption of rules based on the SCM and to encourage uniformity among the districts' architectural coatings rules.

I.

EMISSION ESTIMATES AND RULE STATUS

A. SOLVENTS USED IN ARCHITECTURAL COATINGS

Architectural coatings are formulated with a variety of components including pigments, resins, solvents, and different additives such as driers, anti-skinning agents, anti-sag agents, dispersing agents, defoaming agents, preservatives and fungicides. The primary source of air emissions from architectural coatings is the solvent component. Other ingredients in the coating may also volatize and be lost to the atmosphere but these emissions are generally trivial when compared to the solvent emissions.

A wide variety of solvents are used in formulating architectural coatings. The primary function of a solvent is to disperse or dissolve the paint binder or resin making the paint formulation less viscous and suitable for application. The solvent also helps to wet the surface, enhancing both the adhesion of the film and penetration. The major categories of solvents used in coatings are:

- o Terpene Solvents
- o Hydrocarbon Solvents
  - Aliphatic
  - Aromatic
  - Naphthenes
  - Olefins
  - Chlorinated Solvents
- o Oxygenated Solvents
  - Alcohols
  - Ketones
  - Esters and Acetates

B. EMISSION ESTIMATES

Estimates of VOC emissions from architectural coatings are based upon a 1984 survey conducted by ARB staff with the cooperation of the coatings industry. This survey determined the volumes and solvent (VOC) contents of architectural coatings sold in California during the calendar year 1984. As shown in Figure 1, statewide emissions from architectural coatings are estimated to have been 154 tons per day in 1984 which represents approximately 18 percent of all VOC emissions from solvent use sources in California. Architectural coatings are estimated to account for about 8 percent of all statewide nonvehicular emissions. In 1987, ARB's emission inventory projected emissions from architectural coatings increased by about 17 percent, to 185 tons per day.

SOLVENT USE CATEGORIES AND ASSOCIATED EMISSIONS FOR 1984
TONS/DAY

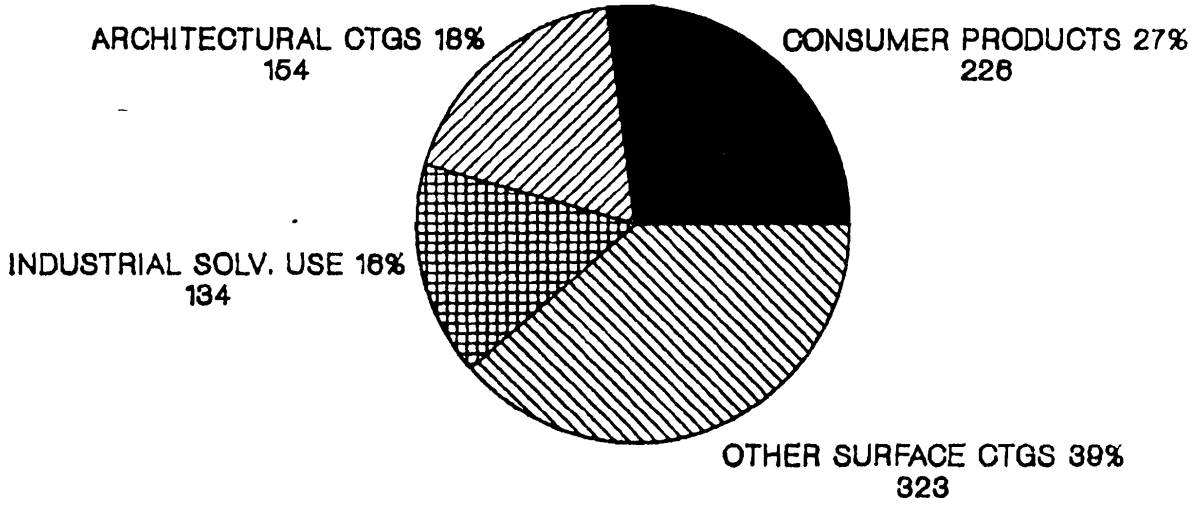


FIGURE 1

Source: ARB Emission Inventory

Emissions from architectural coatings come from a wide variety of coating types. In Figure 2, a breakdown of the emissions from the two major architectural coating categories is shown. The largest source of emissions is from the specialty coating category--113 tons per day (73%), followed by the flat/non-flat coating category which emits 41 tons per day (27%). The specialty coating category is comprised of 27 smaller coating categories such as clear wood finishes (lacquers and varnishes), stains and preservatives, primers, sealers and undercoaters and industrial maintenance coatings. In Figure 3, the emissions from the specialty coating categories is presented. This figure shows that clear wood finishes (19%) are the largest source of emissions from the specialty category followed by industrial maintenance (14%) coatings and stains (13%).

SPECIALTY ARCHITECTURAL COATINGS AND ASSOCIATED EMISSIONS FOR 1984

TONS/DAY

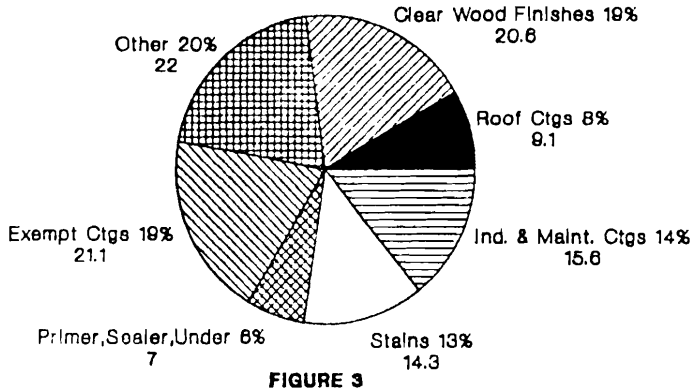


FIGURE 3

Source: ARB Emission Inventory

ARCHITECTURAL COATING CATEGORIES AND ASSOCIATED EMISSIONS FOR 1984

TONS/DAY

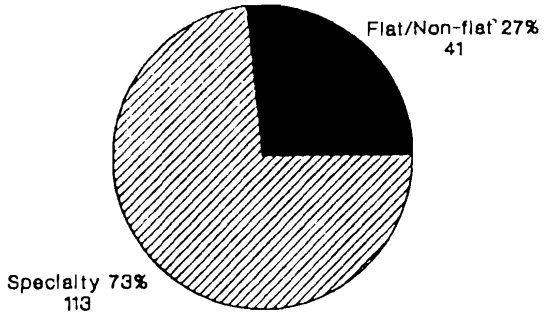


FIGURE 2

Source: ARB Emission Inventory

C. RULE STATUS

Twenty-four of California's forty-one air pollution and air quality management districts have architectural coatings rules. The majority of these 24 districts adopted the 1985 TRG approved model architectural coatings rule. In the 1985 TRG-approved model rule, VOC limits for most specialty coatings categories were to become effective September 1, 1989. As shown in Table 2, the majority of the 24 districts adopted this effective date for the specialty coatings VOC limits. However, the South Coast Air Quality Management District(SCAQMD) and the Bay Area Air Quality Management District(BAAQMD) adopted an effective date of September 1, 1987, and the San Diego County Air Pollution Control District adopted an effective date of December 1, 1987, for most specialty coatings.

Table 2

Architectural Coating Rules in California
Air Pollution Control/Air Quality Managment Districts
as of April 1989

District	Rule Number	Date of Last Rule Amendment	Specialty Coatings Standards Effective Date
Bay Area AQMD	Rule 8-3	9/3/86	9/1/87[1]
Butte County APCD	Rule 240	8/6/85	----[1]
Colusa County APCD	Rule 2.26	1/17/89	1/17/89
El Dorado County APCD	Rule 215	3/12/84	9/1/89
Fresno County APCD	Rule 409.1	10/21/86	9/1/89
Imperial County APCD	Rule 424	11/22/83	9/2/89[2]
Kern County APCD	Rule 410.1	11/28/83	9/1/89
Kings County APCD	Rule 410.1	3/11/86	9/1/89
Madera County APCD	Rule 409	1/5/89	9/1/89
Merced County APCD	Rule 409.1	8/21/84	9/1/89
Monterey Bay Unified APCD	Rule 426	12/13/84	9/1/89
Placer County APCD	Rule 218	4/1/86	9/1/89
Sacramento County APCD	Rule 442	4/28/87	9/1/89
San Berardino County APCD	Rule 1113	6/4/84	----[1]
San Diego County APCD	Rule 67	3/4/86	12/1/87
San Joaquin County APCD	Rule 409.1	9/27/83	9/1/89
Santa Barbara County APCD	Rule 323	3/11/85	9/1/89
South Coast AQMD	Rule 1113	2/6/87	9/1/87
Stanislaus County APCD	Rule 409.1	7/12/83	9/1/89
Sutter County APCD	Rule 3.15	10/15/85	9/1/89
Tulare County APCD	Rule 410.1	5/13/86	9/1/89
Ventura County APCD	Rule 74.2	10/21/86	9/1/89
Yolo-Solano County APCD	Rule 2.12	7/26/79	7/26/84[2]
Yuba County APCD	Rule 3.15	3/5/85	9/1/89

[1] Have non-technology -forcing VOC limits.

[2] All coatings drop to a 250 g/l limit.

II.

SUMMARY OF THE SUGGESTED CONTROL MEASURE

The suggested control measure includes 20 new or revised definitions; new solvent-content limits for 18 specialty coating categories; elimination of 5 specialty coating categories and their corresponding VOC limits through consolidation with other categories; and the elimination of 1 and the addition of 8 administrative requirements.

The revised definitions define more carefully the categories of coatings and no longer contain some non-substantive verbiage. The new VOC limits reflect a re-evaluation of low-VOC coatings technology in the affected specialty categories. The proposed administrative changes will enhance enforceability of the rules, and define more carefully than before the scope of the rules. A comparison of the proposed SCM to the 1985 Architectural Coatings Model Rule is summarized in Tables 3, 4 and 5.

The definitions to be amended, added or eliminated are presented in Table 3. As shown in Table 3, 13 existing definitions have been amended, 7 new definitions have been added and 5 definitions have been eliminated resulting in consolidation of these with other categories.

Proposed changes to specialty coating standards are presented in Table 4. As shown in Table 4, VOC limits have been proposed for 12 previously exempt specialty coatings categories and 5 new specialty coatings categories. In all cases, the VOC limits proposed are currently available and are not technology-forcing. Lower VOC limits are proposed for the three pre-existing specialty coatings categories, Enamel Undercoaters, Quick-Dry Enamels and Specialty Flats. No changes in the VOC limits are proposed for the remaining nine pre-existing specialty coatings categories. Technology-forcing limits, with future effective dates, are proposed for 10 specialty coatings categories.

Table 5 summarizes the administrative proposals in the SCM. The proposed administrative provisions clarify or extend the applicability of the architectural coatings rule in specific circumstances, impose requirements on the handling and disposal of paints and solvents, and establish labeling requirements. These changes will make the architectural coatings rules easier to enforce and will eliminate some disposal practices which needlessly emitted clean-up solvents.

Table 3

Definitions Amended, Deleted or Added in the Suggested Control Measure

Category	Proposed Change
Below Ground Wood Preservatives	Amended
Bond Breakers	Amended
Clear Wood Finishes	New
Lacquers	Amended
Varnishes	Amended
Concrete Curing Compounds	Amended
Dry Fog Coatings	Amended
Enamel Undercoater	Eliminate
Retardant Coatings	Amended
Form Release Compounds	New
Graphic Arts Coatings	Amended
High Temperature IM	New
Magnesite Cement Coatings	New
Mastic Texture Coatings	Amended
Metallic Pigmented Coatings	New

Category	Proposed Change
Multi-color Coatings	No Change
Opaque and Semi-transparent Stains and Wood Preservatives	[illegible]
Pre-treatment Wash Primers	New
Primers, Sealers & Undercoaters	
Quick-Dry Enamels	Eliminate
Quick-Dry Primers, Sealers and Undercoaters	Eliminate
Roof Coatings	Amended
Specialty Flat Coatings	Eliminate
Shellac	Amended
Swimming Pool Coatings	No Change
Swimming Pool Repair coatings	New
Tile-Like Glaze	Eliminate
Traffic Paints	No Change
Waterproofing Sealers	No Change

Table 4

Summary of Proposed Changes to VOC Standards
grams/liter

Category	1985 Model Rule	SCM Effective 9/1/89	SCM Future Effective Dates	
Below Ground Wood Preservatives	Exempt	600	350 (9/1/92)	
Bond Breakers	None	750	350 (9/1/90)	
Clear Wood Finishes				
Lacquers	680	680		
Varnishes	350	350		
Concrete Curing Compounds	350	350		
Dry Fog Coatings	Exempt	400		
Enamel Undercoaters	450	350		
Fire Retardant Coatings	Exempt			
Clear	None	650		
Pigmented	None	350		
Form Release Compounds	None	250		
Graphic Arts Coatings	Exempt	500		
Industrial Maintenance (IM) Coatings	420	420	340 (9/1/92)	
High Temperature IM	None	650	550 (9/1/92)	420 (9/1/94)
Magnesite Cement Coatings	None	600	450 (9/1/92)	
Mastic Texture Coatings	Exempt	300		
Metallic Pigmented Coatings	Exempt	500		
Multi-color Coatings	Exempt	575	420 (9/1/92)	
Opaque and Semi-transparent Stains and Wood Preservatives	350	350		
Pre-treatment Wash Primers	None	780	420 (9/1/94)	
Primer, Sealer & Undercoaters	350	350		
Quick-Dry Enamels	400	250		
Quick-Dry Primer, Sealers & Undercoaters	Exempt	350		
Roof Coatings	300	300		
Specialty Flat Coatings	400	250		
Shellac	Exempt			
Clear	None	730		
Pigmented	None	550		
Swimming Pool Coatings	Exempt	650	340 (9/1/92)	
Swimming Pool Repair Coatings	None	650	340 (9/1/97)	
Tile-Like Glaze	Exempt	420		
Traffic Paints	250	250		
Waterproofing Sealers	400	400		

Notes:

For those categories that have been consolidated with existing categories (eg. Quick-Dry Enamels, Quick-Dry Primers, Sealers & Undercoaters, Enamel Undercoaters, Tile-Like Glaze and Specialty Flat), the proposed standards are those for the respective categories into which the coatings now belong.

Categories with the designation "None" under Model Rule, are new categories proposed in the SCM.

Table 5

Summary of Administrative Proposals

Proposal	Description
Architectural Coatings Survey (To determine actual usage of various products)	Annual Shellac Survey Annual Quarts Survey Every Other Year Survey of all coatings Every Other Year Survey Aerosol Coatings
Labeling VOC Content	VOC Content required to be displayed on coating container.
Most Restrictive VOC Limit	Coatings required to meet the most restrictive standard based on manufacturers labeling and advertising statements.
On-Site Coating of Uninstalled Appurtenances	Clarifies when other rules such as metal parts or wood products apply.
Prohibition of Solicitation	Prohibits specifying non-complying coatings by oral or written contracts.
Rule Effective Date	Gives two years for retailer to clear out stock.
Small Business Exemption	Eliminates expired (1984) small business exemption.
Storage of VOC Containing Material	Requires proper storage of coatings and clean-up materials
VOC Definition	Modifies definition of VOC

III.

IMPACTS ASSESSMENT

A. EMISSION REDUCTIONS

Estimated emission reductions associated with the proposed SCM are given in Table 6. Statewide reduction of VOC emissions that could be realized if the SCM rule was adopted by the districts is estimated at 3,200 tons per year (8.8 tons per day) based on the 1984 architectural survey information. Additional emission reductions of approximately 11,800 tons per year (3.1 tons per day) will be realized when VOC standards with future effective dates become effective. Categories with future effective standards include: industrial maintenance, below-ground wood preservatives, bond breakers, magnesite cement coatings, multi-colored coatings, pre-treatment wash primers and swimming pool coatings. The total emission reductions expected from the proposed SCM, taking into consideration the emission reductions associated with the technology-forcing VOC limits, are estimated to be 11.9 tons/day (4350 tons/year). This represents an 8 percent reduction in emissions based on the 1984 survey. The above emission reductions were calculated based on changes to the 1984 Architectural Coatings Survey and do not take into consideration increased emissions from these categories due to growth. Preliminary estimates by ARB Emission Inventory staff, indicate that emissions from architectural coatings increase to 185 tons per day in 1987. This represents a 17 percent increase in emissions between 1984 and 1987.

The estimated emission reductions are conservative since they do not take into consideration emission reductions due to changes in clean up and thinning solvents usage which would occur from a switch to lower VOC water based coatings. Also, the reduction estimates were based on the assumption that compliance would be achieved by reformulating existing coatings to the proposed standard. It is possible and very likely, that in many cases reformulation will result in coatings with VOC contents much less than the proposed standard. For example, a water borne primer will have a VOC content of about 100 g/l while the allowable limit is 350 g/l.

As shown in Table 6, the largest emission reductions will come from the proposed changes to the VOC limits for clear wood finishes and the

industrial maintenance coatings categories. Together, these two categories account for over 35 percent of the potential emission reductions projected for 1989. For each individual category, however, the percent reduction in emissions is relatively small, 12 percent for industrial maintenance coatings and 7 percent for the clear wood finishes. These small changes are reflective of the problems increasingly encountered in regulating solvents in coatings by the traditional approach of establishing VOC limits for each coating. For many coating categories, the technology is not yet developed to allow for lower VOC alternatives. For these coatings, to achieve additional emission reductions more research and development will be needed. Non-traditional approaches, such as economic incentives may be a way to promote efforts to reduce further VOC levels for these coatings.

Table 6
Estimated Statewide Emission Reductions

Coating Category	VOC Limit, g/l Proposed Rule	1984 Estimated Statewide Emissions Tons/Year	Estimated Emission Reductions Tons/Year	Future Effective VOC Limit, g/l	Additional Emission Reductions Tons/Year
Roof Coatings	300	3,331	318		
Metallic Pigmented Coatings	500	69	2		
Primers, Sealers & Undercoaters	350	2,552	400		
Enamel Undercoaters (Consolidate with P, S & U)	250	890	40		
Quick-Dry Primers, Sealers & Undercoaters (Consolidate with P,S & U)	350	495	165		
Specialty Flat (Consolidate with P, S & U)	350	60	13.6		
Industrial Maintenance (IM)	420	5,695	712	340	8%
Clear Wood Finishes - Varnish	350	2,015	550		
- Lacquer	680	5,516	24		
Previously Exempt Categories					
Below Ground Wood Preservatives	350	4	0.2	350	
Bond Breakers	600	444	0.8	350	
Dry Fog Coatings	400	116	7.2		
Fire Retardant Coatings	650	14	<0.1		
Graphics Arts	500	92	<0.1		
Mastic Texture Coatings	300	485	16		
Multi-Colored Coatings	580	200	32	420	
Shellac - Clear	730	104	<0.1		
- Pigmented	550	111	0.9		
Swimming Pool Coatings	650	181	8	340	
Tile-Like Glaze (Consolidate with IM)	420	41	8	340	
Quick Dry Enamels (Consolidate with Non-Flat)	250	645	280		
Wood Preservatives	350	1,441	150		
Stains	350	5,224	495		
		Total: 29,645 (81 tons/day)	3,223 (8.8 tons/day)		

Notes

Assumes VOC content reduced to, but not below, new standard; does not consider clean-up solvent reductions.

P, S & U = Primers, Sealers and Undercoaters

B. ECONOMIC IMPACTS

To comply with the proposed VOC limits, manufacturers basically have two options: (1) they can replace the non-complying coatings in their formulations with existing complying coatings, or (2) they can reformulate the coatings. Replacing non-complying coatings with complying coatings is often more cost-effective than reformulation because there is minimal research and development involved. Data from the 1984 marketing survey summarized in Table 7, shows the percentage of coatings available in 1984 that could meet the proposed limits. This suggests that the option to replace rather than reformulate non-complying coatings is available to many coating manufacturers. Thus, we expect little, if any, economic impact to the consumer from the proposed limits if coating manufacturers replace non-complying coatings with existing complying coatings.

The economic impact to consumers from reformulating coatings can be either positive or negative and is difficult to estimate. For example, reformulating a coating to use more water will probably require additional research and development costs. However, using water as a solvent can reduce the cost of the coating by reducing the need for expensive solvents and solvent waste disposal. Also, water-based coatings have lower vapor pressures than their solvent-based counterparts. This, in turn, reduces the coating costs somewhat because of the reduced need for pressurized tanks for solvent storage and reduced worker exposure to solvents.

Many of the factors that affect the final cost of a coating could not be quantified. The factors that we could not quantify such as research and development costs, increased surface preparation costs and other factors are listed in Table 8. We could not sufficiently account for these factors since they varied widely for the various coatings affected by the proposed SCM. To simplify the cost analyses, we used the quantifiable cost factors listed in Table 8.

Table 9, presents the expected economic impact to the consumer in two ways: (1) by comparing the expected cost per square feet covered per year for a complying coating versus a non-complying coating, and (2) by estimating the cost-effectiveness of the proposed rule changes in dollars required per pound of VOC reduced. From Table 9 we can see that estimated cost-effectiveness of the proposed changes range from -$4.30 to $6.40 per pound of VOC reduced. This cost compares favorably with the cost of other VOC control measures approved by the Board and many other air quality management districts.

Table 7

1984 Market Survey for Proposed Changes
to Architectural Coatings Model Rule

Category	Percentage of Coatings Sold in 1984 that Meet the Proposed VOC Limit
Roof Coatings	90
Metallic Pigmented Coatings	55
Primer Sealer & Undercoaters (PSU)	68
Quick Dry PSU	5
Industrial Maintenance (IM)	38
High Temperature IM	Unknown
Clear Wood Finishes	
Varnishes	1.2
Lacquers	77
Previously Exempt	
Below Ground Wood Preservatives	53
Bond Breakers	99
Dry Fog Coatings	22
Fire Retardant	98
Graphic Arts	34
Mastic Texture	98
Multi-Colored	94
Shellac	
Clear	100
Pigmented	59
Swimming Pool Coatings	95
Tile Like Glaze Coatings	30
Quick-Dry Enamels	3

Note: Represents the precent of the total volu each coating reported sold in California during 1984 which VOC content at or below the proposed limits. (Source: ARB 19 Architectural Coatings Survey)

Table 8

Factors to Consider for Cost-Analysis

Quantifiable Cost Factors	Unquantifiable Cost Factors
1. suggested retail price	1. increased surface preparation
2. square feet covered per gallon	2. research and development
3. number of years before coating replacement required	3. changes in work practices (e.g. drying time)
4. raw material costs	4. training for using the new coatings
	5. cost of pulling existing non-complying coatings off the market
	6. changes in equipment
	7. reduced worker exposure to solvents
	8. reduced clean-up and disposal of spent or unused coatings and solvents
	9. technology for developing complying coatings transferred to other products.
	10. benefits from improved air quality

Table 9

Cost-Analyses for Various Coating Types

From	To	Change in Cost As Applied	Change in Volatile Organic Compounds grams VOC/liter	Cost-Effectiveness $/lb VOC reduced
Alkyd Primer, Sealer, Undercoater	Modified Styrene/Butadiene Undercoater	- $3.60 to 0.04 / gal	300	- 1.40 to 0.01
Clear Wood Finishes				
Acrylic Solvent-Borne Interior/Exterior	Acrylic Water-Borne Interior/Exterior	- $0.00 to $0.01[a] / ft^2- yr	385-580	0.25 to 1.90
Varnishes Non-Calif-spec	Varnishes Calif-spec	- $0.01 to - $0.02[b] / ft^2- yr	140	- 3.00
Stain Block Non-Calif-spec	Stain Block Calif-spec	$0.68 to $1.10 / gal	170	1.10 to 1.70
Swimming Pool Chlorinated Rubber	Swimming Pool Epoxy	- $0.06 / ft^2-yr	310	- 4.[illegible]
Bond Breakers Solvent-based	Bond Breakers Water-based	$0.00 to - $0.01[c] / ft^2	400	- 0.[illegible]
Specialty Enamels Non-Calif-spec	Specialty Enamels Calif-spec	$0.04[d] / ft^2	170	[illegible]

a This value calculated for a ten year period for both exterior and interior coatings.

b Lifetime expectancies for both California and Non-California spec. varnishes expected to [illegible]

c Expected cost reductions by manufacturer due to substitution of water for expensive solve[illegible] Because of the temporary nature of bond breakers, accounting for life expectancies is no[illegible]

d Lifetime expectancies unavailable.

IV.

RULE EFFECTIVENESS ISSUES

A. ECONOMIC INCENTIVES

To date, California's approach to reducing emissions of solvents from the application of architectural coatings has included only the establishment of VOC content standards and prohibiting the sale of coatings which do not meet those standards. There are some applications which do not lend themselves to further reductions in this manner, where technology has not developed lower VOC alternatives to the coatings presently on the market, (e.g. clear wood finishes, magnesite cement coatings, semi-transparent stains). In these areas, and indeed in all coatings applications where current standards are above 250 grams per liter, economic incentives present a promising, untried way to induce development of low-solvent alternatives to currently available coatings.

Economic incentives might take the form of a fee levied on the solvent content of coatings, or on that portion of the solvent content greater than 250 g/l or some other, appropriate level. This fee would increase annually. Eventually, the prices of high-VOC coatings would reach levels which would provide a strong incentive to shift to other coatings or to the adoption of new, low-emission practices in the application of coatings for certain jobs. Moreover, the old high VOC coatings would still be available for those applications where they might be necessary, at a price which corresponds to the air pollution potential of the coatings.

Before economic incentives can be implemented, unresolved issues associated with economic incentives include:

- Neither the ARB nor the districts now have the clear authority to impose economic incentives on architectural coatings.
- A decision would have to be made on how to use the money collected.
- The effectiveness of economic incentives would have to be demonstrated.

- We need a method to set the level of fees.

The ARB staff has committed to develop further the concept of economic incentives as an emission reduction tool in architectural coatings.

B. SURVEYS

Based upon its own deliberations and upon extensive conversations with industry representatives, the committee believes that the regular conduct of four surveys of architectural coatings sold in California will be beneficial to monitor the future progress of emission reductions and to identify opportunities for further reductions. The proposed surveys are: a biennial survey of all architectural coatings after the model of previous architectural coatings surveys; an annual survey of coatings sold in quarts; an annual survey of shellac sales; and biennial survey of coatings sold in aerosol containers. The information gained from these surveys will enable us to monitor the effectiveness of the architectural coatings rules, and to discern any trends in the coatings market which may affect the effectiveness of the rules.

The ARB has conducted three previous architectural coatings surveys, covering California sales of architectural coatings in 1976, 1980, and 1984. The information from most recent of these surveys is now four years old.

Similarly, we do not have architectural coatings sales records with which to document the effectiveness of the architectural coatings regulations. With the growth in California's population, coating use may have outstripped air quality gains expected from architectural coatings rules. The ARB and the districts need a regularly conducted survey to measure the effectiveness of the architectural coatings rules. The staff will in the future survey sales of architectural coatings in California every two years.

One of the more contentious issues in the development of this SCM was the exemption for small containers. The initial proposal put forth was to eliminate the small container exemption altogether. The staff had heard rumors of the small container exemption being used as a "loophole", with architects or others specifying the use of non-complying coatings bought in multiple-quart purchases. The previous architectural coatings surveys do not separate out sales of coatings in quart containers. The staff has no way to determine whether these rumors represent isolated incidents or are indicative of a large-scale trend.

For the above reasons, the staff will survey annually the sales and VOC content of coatings in quart containers or smaller. This survey will begin in 1990 and continue at least through 1996, after which surveys would be conducted biennially, in conjunction with the Architectural Coatings survey.

Architectural shellac usage has been declining over the last five years. Because of the relative high VOC limits for shellac and the more stringent requirement in other categories, we are concerned about significant increases in shellac usage. To determine if this is occurring, we need to track sales of shellac in California. Since there are only four major manufacturers of shellac in the U.S., we believe a survey would be relatively easy and inexpensive.

Previously, coatings sold in aerosol containers have been exempted from the architectural coatings rules because of the small-container exemption. The three Architectural Coatings surveys already conducted have not investigated sales of coatings in aerosol containers. Consequently, the staff has no accurate inventory of the emissions from this category of coatings. Aerosol coatings may be a significant unmeasured source of solvent emissions. To develop an inventory, we will survey annually the sales of coatings in aerosol containers biennially, in conjunction with the Architectural Coatings survey.

The successful conduct of the above surveys to develop inventories will require the active cooperation of industry. The EL RAP group of Southern California Paint Manufacturers and the National Paint and Coatings Association have indicated their willingness to assist in the conduct of these surveys.

C. TECHNOLOGY-FORCING STANDARDS

A technology-forcing standard is one which cannot be met now, but which has a future effective date, thus forcing coatings manufacturers to develop new technology to meet the lower standard by its effective date. Although technology-forcing standards have had some success in the architectural coatings field, they can be problematic from both a technical aspect and a regulatory aspect. All parties must recognize that even with good faith efforts the future standards may not be met, and changes to the regulation may be necessary. Manufacturers may fail to develop the new technology, and relaxation of rules already adopted may constitute an impermissible relaxation of the State Implementation Plan (SIP).

When a districts adopts a rule, and submits it to the EPA for inclusion in the SIP, EPA reviews that rule, and if it determines the rule acceptable, includes it in the SIP. Inclusion in the SIP means that a rule becomes a federal regulation adopted pursuant to the Clean Air Act. As such, the rule is enforceable by federal authorities as well as by the state and district. EPA's acceptance of a district's rule and its inclusion in the SIP involve a delegation to the district of EPA's federal authority to enforce the rule.

In the event a district proposes to change the provisions of a rule, which has been included in the SIP, the old rule remains in effect as a SIP provision until EPA has approved the change for inclusion in the SIP. When the change involved is more stringent than the previous rule, there is no conflict. Conflict arises when a district proposes a

change which is less stringent than the approved SIP provision and EPA disagrees with the basis for the changes. Since the accepted provision remains in place as a federal regulation, EPA enforcement officials may enforce it themselves, and will also put pressure on the district to continue enforcement of the old provision. EPA may impose sanctions on the district for the district's failure to enforce SIP provisions.

The ARB-CAPCOA Suggested Control Measure contains several technology-forcing standards. These standards have elicited expressions of concern from industry and from districts. What will districts and EPA do in the event paint manufacturers are unable to meet the technology-forcing standards? Industry representatives point to their experience with the 350 g/l standard for varnishes which the three largest districts adopted in 1985, effective in 1987. When manufacturers convinced the districts to move the effective date to 1989, EPA continued to enforce the 1987 date as part of the SIP. Several manufacturers withdrew from the market in those districts, many stopped marketing varnishes in containers larger than a quart. Only few managed to meet the standard; with coatings that do not match the performance of the older, high-solvent coatings.

Those manufacturers who developed complying products are not happy with the characteristics of those products and market different products (high-solvent) in quart containers and smaller. Moreover, we have been told that applicators find the complying products unacceptable for some uses, and thin them by adding mineral spirits when they use them. Thinning, of course means more solvents evaporated to the air as the coatings dry. Moreover, since the architectural coatings standards are meant to apply to the coatings as they are used, thinned coatings do not comply with the regulations.

The committee believes that technology-forcing limits, which have been important tools to encourage industry toward lower-VOC coatings, may be approaching the limits of their effectiveness for architectural coating rules. The committee is also concerned about the ability to relax standards with future effective dates if, despite diligent effort by industry, these standards can not be achieved.

We believe there are three options in this situation.

1. The districts adopt technology-forcing standards now, and address the issues later in the event complying coatings are not available by the effective date.

2. The districts not adopt the technology-forcing standards in the rule, but consider their adoption later, as the proposed effective date nears, in light of intervening technical developments.

3. The districts adopt the technology-forcing standards into the rules now, but specify that the emission reductions associated with the technology-forcing limits are to be used toward attainment of the state standards. Under this approach, the technology-forcing limits would not become part of the SIP.

V.

OPTIONS FOR FUTURE EMISSION REDUCTIONS

Coatings technology has made significant advances over the last ten years. We anticipate even more rapid changes in coatings technology over the next five to seven years.

To maximize the emission reductions from architectural coatings, we need to closely follow improvements in technology. Lower VOC coatings offer the best option in the short term for slowing the growth of emissions from architectural coatings. Additional investigation is needed into the availability of low-VOC coatings. New coating application techniques, such as high efficiency spray equipment, need to be examined. Opportunities may also exist to reduce emissions by encouraging pre-coating of architectural components in the shop where air pollution control equipment may be used. Non-traditional approaches, such as economic incentives, need to be examined. In Table 10, several areas are identified where we believe additional emission reductions may be available in the next several years.

The TRG has committed to working with the coatings industry to identify opportunities for further emission reductions from architectural coatings. The TRG intends to re-evaluate this suggested control measure and bring forward amendments by March 1992, if appropriate. Also, as part of this effort, we will work with the TRG to develop a new definition for volatile organic compounds. The new definition will incorporate requirements of the photochemical smog, toxic air contaminant, global warming, and upper stratospheric ozone programs. This new definition will facilitate maximizing environmental benefits of all these programs.

Table 10

Options for Future Emission Reductions

Category/Area	Emission Reduction Options
Improved Application	Require high transfer efficient spray Techniques equipment such as ,high volume low pressure (HVLP) systems, to apply architectural coatings
Primers, Sealers & Undercoaters	Water based technology currently offers many coatings with VOC in the 100 g/l range. It may [illegible] possible to significantly reduce the VOC limits for this category.
Fire Retardant	Water based technology and new resins Coatings sh[illegible] allow for the formulation of low VOC fire retarda[illegible] coatings in the next three to five years.
Industrial Maintenance Coatings	Technology is moving rapidly in this area. Extreme performance coatings at or below 250 g/[illegible] be available for most applications in the next 5 [illegible] years.
Clear Wood Finishes	Improved water based technology and a shift toward prefinished materials should provide significant emission reductions in this category over the next 5 to 7 years.
Shellac	Pigmented shellacs should be able to be reduced from 5[illegible] to 450 g/l within the next 3 years. Also, work on water borne shellacs may offer further reductions in the next 5 years.
Metallic Pigmented Coatings	For most applications we believe water based or 2 component coatings will allow the VOC conte[illegible] of these coatings to be reduced to below 350 g/l.
Graphic Arts Coatings	Resin manufacturers have not put too much effort in[illegible] the development of low VOC graphic arts coatings. However, this trend seems to be changing. We believe the VOC content in this category can be reduced to 3[illegible] g/l in the next 5 years.
High Temperature Industrial Maintenance	High temperature coatings in the 550 g/l range a[illegible] currently being field tested. New 100% solid sil[illegible] resins are being advertised. Coatings with VOC co[illegible] below 400 g/l may be available in the next three [illegible]
Roof Coatings	Increased movement toward high solids and impro[illegible] application techniques should allow VOC conte[illegible] coatings in this category to approach 200 g/l.
Clean-Up Solvents	Advances in non-VOC clean-up materials and the [illegible] use of water based coatings should provide sig[illegible] reduction in solvent use.
Chlorofluorocarbons(CFC)	Investigate the extent to which ozone depleting [illegible] being used in coatings. Establish a date aft[illegible] these compounds may not be used.
VOC Definition	Investigate the possibility of improving the def[illegible] of VOC to be consistent with requirements of photochemical smog, toxic air contaminant, gl[illegible] warming gnd upper stratospheric ozone progra[illegible]. Investigate the extent that the revision would r[illegible] ohe need to reduce the use of certain compo[illegible].

VI.

ENVIRONMENTAL IMPACTS

We have identified no adverse environmental impacts associated with implementation of this suggested control measure with respect to global warming, plant and animal life, noise levels, light and glare, land use and natural resources, or sociological factors. Implementation of the control measure may also cause a shift in some waste-disposal practices, affecting both water treatment and solid waste disposal. There may be some worker-safety issues associated with the proposed control measure caused by a shift in coating types. We are unable to quantify any of these additional impacts. A brief discussion of the most significant environmental impacts related to air quality, water quality, and worker safety follows.

1. Emissions of Hydrocarbons

We estimate that implementation of this regulation statewide will reduce emissions from application of architectural coatings by about 9 tons per day (TPD) in the year following adoption, and by an additional 3 TPD to 12 TPD in the fourth year after adoption. Still further reductions can be expected at later dates, as some of the later standards come into effect. These estimates are based on the sales volume indicated in the 1984 Architectural Coatings survey. Since the coatings market in California has been growing, we believe actual reductions (from 1988 sales volume) will be greater.

2. Emissions of Exempt Solvents

Faced with some of the new standards, manufacturers may elect to use exempt solvents such as 1,1,1-trichloroethane or other halogenated compounds to reduce the VOC content of their coatings to meet the new standards of the proposed SCM. Thus, implementation of this rule may result in an increase in those emissions. Some of these substrates (e.g. 1,1,1-trichloroethane) may be reviewed for possible identification as toxic air contaminants pursuant to Health and Safety Code Section 39655 *et seq*. Identification of a substance as a toxic air contaminant would almost certainly lead to its removal from architectural coatings. Other exempt solvents are known or suspected to participate in the depletion of stratospheric ozone. Their use may, too, be restricted or

even banned outright. We do not anticipate an increase in use of chlorofluorcarbons because international agreements have restricted their production and use.

3. Worker Safety Issues

Shifts toward use of two-component coatings or of coatings containing exempt solvents could lead to an increased exposure of workers to substances such as 1,1,1-trichloroethane, aziridenes, chlorofluorocarbons, toluene di-isocyanate, and others. This exposure has the potential for adverse health effects among workers. These impacts will be imitigated by changes in application techniques involving use of safety equipment.

The clear wood finishes standards will almost certainly force the use of lacquers off the job-site and into shop. This will reduce worker exposure to lacquer fumes. A similar reduction in worker exposure to some paint fumes will come from the elimination of some paint types in the industrial maintenance coatings.

4. Noise

Elimination of job-site application of lacquers will reduce the use of compressors for spraying. Job sites will be noticeably quieter.

VII.

DISCUSSION OF PROPOSED AMENDMENTS

The proposed amendments are summarized below in two sections. In Section A, the proposed changes to the coating definitions and VOC standards are presented. Recommendations for administrative changes are discussed in Section B. For each proposed amendment, the basis for the recommendation is presented along with a discussion of any pertinent issues that were raised by industry or the committee.

A. DEFINITIONS / STANDARD PROPOSALS

1. Below Ground Wood Preservatives

RECOMMENDATION

Establish the below ground wood preservative VOC limit at 600 g/l and then, effective 3 years after adoption of the rule, consolidate this category into the opaque wood preservative category with an effective VOC limit of 350 g/l.

Proposed VOC Limit: 600 g/l (1989) 350 g/l (1992)
Current VOC Limit: Exempt (Current levels about 625 g/l)

BASIS FOR RECOMMENDATION

This proposed amendment was suggested to remove below ground wood preservatives from exempt status and make it subject to the provisions of the architectural coatings rule. The 600 g/l standard is currently achievable based on the 1984 architectural coating survey. Over 50% of the below ground wood preservatives sold in 1984 could meet a 600 g/l standard. We believe three years is adequate time to advance below ground wood preservative technology to produce a 350 g/l formulation and allow registration of new products.

ISSUES

The comments we received were supportive of the proposed standard of 600 g/l. Representatives of companies who market below ground wood

preservatives believed that they would be able to reformulate their products to meet a 600 g/l limit. There was concern expressed, however, regarding the proposed 350 g/l standard to become effective 3 years after adoption of the rule. Because the time required for product registration under the Federal Government's FIFRA Program and the California Department of Food and Agriculture's Pesticide Management Program may take up to two years, formulators desiring to develop a 350 g/l compliant coating have essentially only one year to develop a 350 g/l coating if they wish to complete the registration process before the new standard becomes effective. If the technology does not quickly become available, companies may have to withdraw their below ground wood preservative products from the California market.

2. Bond Breakers

RECOMMENDATION

Establish the bond breaker VOC limit at 750 g/l and maintain that standard until 9/1/90 at which time the VOC limit would be reduced to 350 g/l.

Proposed VOC Limit: 750 g/l (9/1/89) 350 g/l (9/1/90)
Current VOC Limit: Exempt (Current levels 350-800 g/l)

BASIS FOR RECOMMENDATION

Two of the major California suppliers of bond breakers have assured us a 350 g/l standard, although not currently achievable, would be achievable in 1990. To allow the time necessary for testing of the low-VOC bond breaker formulations, we agreed to initially establish the standard at a readily achievable limit, then lower the standard to 350 g/l in 1990.

ISSUES

We are unaware of any outstanding issues regarding the proposal for bond breakers.

3. Clear Wood Finishes

RECOMMENDATION

Define Clear Wood Finishes as follows:

> Clear Wood Finishes: Clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a durable transparent or translucent solid film.
>
> Lacquers: Clear wood finishes formulated with nitrocellulose synthetic resins to dry by evaporation without chemical reaction

and to provide a quick drying, solid protective film, including clear lacquer sanding sealers.

Varnishes: Clear wood finishes formulated with various resins to dry by chemical reaction on exposure to air.

VOC Proposed Limits:

	Effective 9/1/89	Effective 9/1/90	Effective 9/1/94
Varnishes:	350 g/l		
Lacquers:	680	550	275

Existing VOC Standard Limits:

Varnishes:	350 g/l
Lacquers:	680 g/l

BASIS FOR RECOMMENDATION

Several companies market complying 350 g/l clear wood finishes. We recognize that some practices in the coating industry may change, because of the properties of the complying coatings. This will probably result in the transfer of some coating operations from the job-site to shops. The "phase-down" of lacquer solvent content is intended to allow time for this shift without imposing a sudden major disruption on the construction industry.

In a phone survey conducted by ARB, thirteen of twenty-five companies surveyed indicated they marketed complying varnishes. One company has a complying solvent borne varnish which can be used on floors, cabinets and trim, and which is available in gloss, semi-gloss, and satin sheen. Another markets water-borne finishes with solvent contents of 175 g/l (lacquer) and 336 g/l (polyurethane varnish). Application techniques for these products are somewhat different than those for solvent-borne coatings.

Several companies market complying water-borne finishes for floors, gymnasium floors and for bowling lanes. Some companies also offer 100%-solids, two-component finishes for gym floors or bowling lanes. A California manufacturer markets a line of water-borne floor coatings suitable for gym floors and residential and commercial floors. Prices on these coatings are around $15.00 per gallon. The company claims to have a contract with the Los Angeles Unified School District to supply coatings for gymnasium floors.

A Dutch company has a line of water-borne clear wood finishes (and stains) for exterior and interior use. These coatings have been on the market in Europe for five years. Although they are expensive at the present, increased demand could spur the development of additional production capacity and bring prices down. The same resin-types are available from at least two American resin suppliers.

We have visited a new construction site in the South Coast Air Basin where we saw a demonstration application of nitro-cellulose lacquer, a water-borne clear coating, and a 350 g/l oil-based varnish. Based largely on that demonstration, we are proposing more time for the reduction of solvent content of lacquers used as architectural coatings.

ISSUES

With current job-site application practices, varnishes and water-borne coatings do not provide acceptable results.

Emissions from clear wood finishes are estimated to be 21 tons per day, making this the largest source of VOC emissions among architectural coatings.

This proposed change will eliminate the use of lacquers on substrates other than wood, and eliminate architectural use of pigmented lacquers altogether. Moreover, after the imposition of the 550 g/l standard for lacquers, on-site application of lacquers may become so difficult that their use may move into shops, where add-on controls can meet equivalent emissions standards. The use of lacquers as masonry coatings or pavement sealers will be proscribed.

The committee originally proposed a limit of 350 g/l for all clear wood finishes, effective upon adoption. We were asked to consider following the schedule in SCAQMD Rule 1136 (Wood Products Coatings) for lacquers. A number of contributors stated that a limit of 350 g/l for all clear wood finishes would eliminate the use of lacquers, which offer properties not found in complying coatings. An essential feature of lacquers is rapid drying, essential for quick application. An applicator can apply three coats in one day. Complying coatings cannot be applied in such a short period of time because of longer drying times. Other clear systems cannot be applied as a complete system (seal, sand, topcoat) in just 24 hours, as can lacquers. Moreover, lacquers offer an almost clear finish, while other finishes are yellowish. Water-based technology cannot match this performance. A shift to water-based technology would cause shift away from one-day jobs to multi-day jobs, with greater expense.

Several commentors said that varnishes are not a good replacement for lacquers because of yellowing problems. Also, varnish does not dry as quickly. Lacquers are far superior to varnishes with regards to clarity, non-yellowing, quick dry and ease of touch-up.

The suggestion was made that the committee visit a construction site (housing tract) where lacquers are being used to see the conditions under which lacquers must be applied and discuss lacquers and the alternatives with the painting contractors--the people who use these products. In new home construction, when cabinets, doors, and frames need to be coated, they have to be out of dust quickly. Varnishes and water-borne systems don't work because of longer dry times.

In the three largest districts in California, the solvent content limits for varnishes have been in place since September 1987 are the same as this proposal. Thirteen of twenty-five companies surveyed have developed coatings to comply with those regulations. Most reported that performance of those coatings does not match that of the coatings marketed under the prior limit (500 g/l), but is not unsatisfactory. These companies and others are working on improving the performance of 350 g/l solvent-borne varnishes. Relaxation of those standards would inhibit these efforts.

Costs of 350 g/l coatings are higher than those of non-complying coatings. Use of some complying coatings may entail major changes in the practices of new-construction painting contractors, with higher labor costs as well.

Another contributor commented by mail that the 350 g/l limit is simply too low for brushable floor coverings. He recommends that the limit for such coverings be set at 420 g/l. Proposed changes for industrial maintenance coatings and clear wood finishes, taken together would eliminate brushable nitrocellulose lacquers, eliminate specialty designations for industrial primers, eliminate the use of industrial finishes in residences, and all other solvent-borne brushable systems that might perform satisfactorily as floor coverings.

There has been a great deal of controversy over this proposed amendment. Many manufacturers claim that they are unable to manufacture satisfactory complying coatings, and disparage the quality of the few manufacturers who claim to have such coatings. We believe that clear wood finishes is an area where economic incentives would be an effective way to reduce the solvent content of coatings without severe economic dislocations. An annually increasing fee on the solvent content of coatings with VOC content above 250 g/l would provide coatings manufacturers and users with a strong incentive to accomplish that reduction without making coatings suddenly unavailable for use where no satisfactory substitute is currently available. We anticipate that such a reduction would be accomplished by a shift in practices, and by the development of lower-solvent coatings.

4. Concrete Curing Compounds

RECOMMENDATION

Amend the definition of concrete curing compounds as follows:

> Concrete Curing Compounds: Coatings applied to freshly poured concrete to retard the evaporation of water.

BASIS FOR RECOMMENDATION

Changes are proposed to clarify the definition of concrete curing compounds.

ISSUES

There are no issues concerning this proposal.

5. Dry Fog Coatings

RECOMMENDATION

We propose the following definition and standard for dry fog coatings:

> Dry Fog Coatings (Mill White coatings): Coatings formulated only for spray application such that overspray droplets dry before subsequent contact with other surfaces.

Proposed VOC Limit: 400 g/l
Current VOC Limit: Exempt (Current levels about 410 g/l)

BASIS FOR RECOMMENDATION

The proposed VOC limit is based on the 1984 Architectural Coating Survey in which a large percentage of the coatings reported had VOC contents equal to or less than 400 g/l. Conversations with marketers of the products confirmed the availability and adequate performance of complying dry fog coatings. The definition was re-worded to include terminology currently in some district rules and to indicate these coatings are used only in spray applications and are not to be applied by brush or roller where the "dry-fog" characteristic is not necessary.

ISSUES

The proposal for this category will have minimal impact on emission reductions. We intend to revisit this category in three years to investigate the possibility of lowering the standard to 350 g/l.

6. Enamel Undercoaters

RECOMMENDATION

Eliminate the definition of and special standard for enamel undercoaters.

BASIS FOR RECOMMENDATION

Currently there is a separate definition and category for Enamel Undercoaters, with a VOC limit of 350 g/l. This amendment would eliminate this category and these coatings would fall into the proposed Primers, Sealers, and Undercoaters category with the same VOC limit of 350 g/l.

We question the need for a special category for enamel undercoaters with a higher VOC content than other undercoaters. We have received no information that there is a genuine need for them which cannot be met by 350 g/l VOC coatings. Resin manufacturers indicate that resins are available with which to formulate complying enamel undercoaters.

ISSUES

We received comments at the first workshop that 350 g/l will work for primers, but not for enamel undercoaters, which cannot be made satisfactorily at levels much below 450 g/l. We received no additional information to support a higher standard.

7. Fire Retardant Coatings

RECOMMENDATION

Revise the fire retardant coating definition and establish new VOC limits as follows:

> Fire Retardant Coatings: Coatings which have a flame spread index of less than 25 when tested in accordance with ASTM Designation E-84-87, "Standard Test Method for Surface Burning Characteristics of Building Material, " after application to Douglas Fir according to the manufacturers recommendations.

Proposed VOC Limits: Clear Fire Retardant Coatings: 650 g/l
Pigmented Fire Retardant Coatings: 350 g/l

Current VOC Limit: Exempt (Current levels 100-800 g/l)

BASIS FOR RECOMMENDATION

The proposed standard was based on current technology for fire retardant coatings. ASTM E-84-87 was chosen as a test method for fire retardant coatings after discussions with safety engineers from the University of Maryland and the Worchester Technical Institute confirmed this test method will distinguish between a conventional coating and one that is truly fire retardant when tested on Douglas Fir.

ISSUES

Lower-VOC coatings are available, however, we were not able to obtain definitive answers on the use of fire retardant coatings and the requirements under local building codes, fire safety codes and the like. Our conversations with fire safety engineers also revealed that there exists differing opinions in the fire safety industry pertaining to the validity of the test methods for fire retardant coatings and whether or not these test methods accurately predict the performance of a fire retardant coating under actual fire conditions. The ASTM Committee D-1, "Paints," has formed a task group to review and develop test methods for

fire retardant coatings. There are also conferences scheduled in the near future that will address many of our questions on fire retardant coatings. We intend to follow these activities and revisit this category in three years to investigate the possibility of future emission reductions and revision of the test method.

8. Form Release Compounds

RECOMMENDATION:

Create a category for form release compounds with the following definition and standard:

> Form Release Compounds: Coatings applied to a concrete form, tp prevent freshly poured concrete from bonding to the form. The form may consist of wood, metal, or some material other than concrete.

Proposed VOC Limit: 250 g/l
Current VOC Limit: Not Applicable

BASIS FOR RECOMMENDATION:

In the old rule there is no category for these coatings which are estimated to have higher usage in California than bond breakers. Since bond breakers are estimated to emit over 500 T/Y of VOCs, it is expected that the regulation of form release compounds will provide a large emission reduction. These compounds are used extensively in the building industry in concrete pouring operations.

ISSUES:

We are unaware of any unresolved issues pertaining to form release compounds.

9. Graphic Arts Coatings

RECOMMENDATION

Revise the graphic arts coating definition as follows:

> Graphic Arts Coatings (Sign Paints): Coatings formulated for and hand-applied by artists using brush or roller techniques to indoor and outdoor signs (excluding structural components) and murals, including lettering enamels, poster colors, copy blockers, and bulletin enamels.

Proposed VOC Limit: 500 g/l
Current VOC Limit: Exempt (Current level about 500 g/l)

BASIS FOR RECOMMENDATION

Our first proposal was to establish the graphic arts standard at 400 g/l. However, discussions with respondents to the 1984 survey revealed errors in the reported VOC values, particularly with regards to thinning. In light of this new information, we raised the standard from the proposed 400 g/l to 500 g/l to allow artists the latitude necessary for thinning. To improve the clarity and enforceability of the rule, the definition has been expanded to include other applications of graphic arts coatings, including murals and use as copy blockers and specifically exclude those components of a sign that do not require graphic arts coatings.

ISSUES

This is a very small category with limited application and the 1984 survey may reflect usage of graphic arts coatings for non-architectural application. We intend to further investigate the use of graphic arts coatings on architectural structures and revisit this category in three years to investigate further emission reductions.

The committee was asked to better address the use of graphic arts coatings. Currently, graphic arts coatings are subject to several rules depending on the district in which it is being applied, what substrate they are applied to and where they are applied. As an example, in districts having metal parts and products rules, a graphic arts coatings applied to a metal sign in a shop situation would be subject the metal parts and products rule. If the same coating is applied to a wooden sign in a shop it would fall under district wood product rules, or if a plastic sign is painted in a shop situation, a plastic parts and product rule standard would have to be met. On the other hand, if a sign is painted after installation, it is considered an architectural structure and, regardless of the substrate, the graphic arts coating would be subject to an architectural coating rules. As can be seen from this example, suppliers of these coatings, coating users, and air pollution enforcement officials must interpret a myriad of rules when dealing with graphic arts coatings. The Technical Review Group recognizes the above problems and has tried to establish a definition which takes into account the needs of the sign-painting industry without allowing wholesale use of high-solvent paints, for jobs which do not legitimately constitute sign painting within the meaning of the rule.

10. Industrial Maintenance Coatings (Industrial Primers & Topcoats)(#7-9)

RECOMMENDATION

Consolidate industrial primers and topcoats into one category entitled "Industrial Maintenance Coatings" and create a new category, "High Temperature Industrial Maintenance Coatings" with definitions as follows:

Industrial Maintenance Coatings: Industrial Maintenance coatings are high performance coatings formulated for and applied to substrates in industrial, commercial, or institutional situations that are exposed to one or more of the following conditions:

i) immersion in water, wastewater or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;

ii) acute or chronic exposure to corrosive, caustic or acidic agents,chemicals, chemical fumes, chemical mixtures or solutions;

iii) repeated exposure to temperatures in excess of 250°F,

iv) repeated heavy abrasion, including mechanical wear and repeated scrubbing with industrial solvents, cleansers or scouring agents,

v) exterior exposure of metal structures

Industrial Maintenance coatings are not for residential use or for use in areas of industrial, commercial or institutional facilities such as office space, lunchrooms, and meeting rooms.

High Temperature Industrial Maintenance Coatings: Coatings formulated for and applied to substrates exposed continuously or intermittently to temperatures above 400 degrees Fahrenheit.

Industrial Maintenance Coatings Standards

	Proposed Effective 9/1/89	Proposed Effective 9/1/92	Current
Industrial Maintenance Coatings	420	340	Exempt (Current levels 420-550 g/l)
High Temperature Industrial Maintenance Coatings	650	550	Exempt (Current levels 500-700 g/l)

Industrial Maintenance Coatings Labeling Requirements:

In addition to the labeling requirements in Section (d), industrial maintenance coatings are required to include on the label one of the following statements:

"Not for Residential Use" or

"Not for Residential Use in California."

This provision will become effective 1 year after the adoption of the rule.

Residential is defined as areas where people reside or lodge including single and multiple family dwellings, condominiums, apartment complexes, motels and hotels.

BASIS FOR RECOMMENDATION

Our main goals in revising the industrial primer and topcoat category is to: 1) restrict the use of these coatings by residential users and retain the usage of these coatings where the environmental conditions warrant the use of high performance coatings, 2) to achieve emission reductions from this large (15.6 T/D) category, and 3) to encourage the use of lower VOC high performance coatings when they are available.

To meet these goals, we have added language to the rule to prohibit the use of industrial coatings by residential users and restrict the use in areas of commercial and industrial facilities that have similar environments to a residence. To aid in implementation of the residential restriction, a requirement was added to include "Not for Residential Use" on the label of all industrial maintenance coatings.

We have also changed the title and definition of this category. The name of this category has been changed from industrial maintenance topcoats and primers to industrial maintenance coatings since, in most cases, industrial topcoats and primers can be used interchangeably and, under the new standards, the VOC limit is the same. The definition has been redefined to include those conditions were high performance industrial maintenance coatings are necessary. When conditions other than those defined in the industrial maintenance definition warrant the use of a high performance coating, a variance would need to be obtained from the district.

Emission reductions will be achieved by lowering the VOC standard for these coatings and by restricting the use of industrial maintenance coatings where they are not absolutely necessary. The initial VOC standards are based on currently available technology. Lower effective VOC limits have been set for 3 years from adoption of the rule to allow time for reformulation and product development. Both our discussions with industrial maintenance coating formulators and many of the written comments submitted support the lower VOC limits, in many cases low-VOC 2-component epoxies and urethanes already meet the lower (340 g/l) VOC standards.

ISSUES

We believe that most of the issues pertaining to the industrial maintenance category have been resolved. However, our discussions with resin suppliers and industrial maintenance coating manufacturers indicate that technology is moving quickly toward lower-VOC industrial maintenance coatings. We intend to revisit this category in 3 years to examine the possibility of achieving additional emission reductions by lowering the standard for industrial maintenance coatings to 275 g/l in 1994.

One other issue is the apparent SIP relaxation when a new category is created for a coating that has not been able to achieve the current VOC limit. EPA views the creation of a High Temperature Coating category as a relaxation from 420 g/l to 650g/l. Our position is that, overall, the proposed revisions to the model rule will result in emission reductions from architectural coatings even though in selected categories there will be small emission increases. When the technology is not available to support a VOC limit, which is the case for high temperature coatings, it is counterproductive to establish an unrealistic VOC limit. We are aware of efforts currently underway to develop lower VOC high temperature coatings and believe the proposal to lower the standard to 550 g/l in 2 years will encourage further research into lower -OC coatings and provide adequate time of product development and performance testing.

11. Magnesite Cement Coatings

RECOMMENDATION

We recommend the temporary establishment of a category for coatings used to seal magnesite cement decking material. We propose the following definition and standards for magnesite cement coatings.

> Magnesite Cement Coatings: Coatings formulated for and applied t magnesite cement decking to protect the magnesite cement subs from erosion by water.

Proposed VOC limit:	600 g/l (9/1/89)	450 (9/1/92)
Current VOC Limit:	680 g/l	

BASIS FOR RECOMMENDATION

To our knowledge, only one company manufacturers magnesite cement decking material. That company also manufactures the acrylic lacquer coatings for magnesite cement decks. Other amendments to the architectural coatings rules which we are proposing (particularly th narrowing of the definition and uses of lacquers) would make these coatings unavailable.

We believe, on the basis of information supplied by the manufacturer, that they have made a genuine effort to develop low-solvent coatings for

magnesite cement, and are continuing to work on this problem. We believe that the company should be given three years to continue this effort.

Elimination of the acrylic lacquer coatings for magnesite would work an undue hardship on the owners of buildings with magnesite decking material and on the manufacturer, who would have to pay off many warranty claims.

ISSUES

The amendments to Clear Wood Finishes embody a major change from the current architectural coatings rules. Lacquers would not be allowed for use on substrates other than wood, and pigmented lacquers not at all. This would eliminate the use of clear and pigmented masonry lacquers. In general, we believe there are adequate coatings for masonry which can be marketed in the proposed sealer category (350 g/l) or the current waterproofing sealer category (400 g/l), which will remain.

The manufacturer of magnesite cement decking material has repeatedly urged the establishment of a category to allow the use of acrylic lacquers to seal magnesite cement decks. According to the company, elimination of these coatings would make impossible the maintenance of existing magnesite decks at apartments, motels, and residences, chiefly in Southern California. Inability to perform this maintenance could lead to premature failure of the decking material, requiring expensive replacement either by owners or by the manufacturer, under warranty.

Coatings other than the company's acrylic lacquer have failed in tests conducted by the company. Magnesium oxychloride, which is the basis of magnesite cement, is strongly alkaline and attacks most coatings applied to it, preventing adhesion. The most promising low-solvent coatings tested on magnesite to date have failed massively shortly after application (e.g. ~1 wk), peeling up in large sheets from the magnesite cement decks on which they were applied.

12. Mastic Texture Coatings

RECOMMENDATION

Consolidate mastic texture coatings and waterproofing mastic coatings into one definition and standard as follows:

> Mastic Coatings: Coatings formulated and used to cover holes and minor cracks, and to conceal surface irregularities and applied in a film thickness no less than 10 mils (dry, single coat).

Proposed VOC Limit: 300 g/l
Current VOC Limit: Exempt (Current level at about 150-600 g/l)

BASIS FOR RECOMMENDATION

The 1984 Architectural Coatings Survey supports the 300 g/l limit for both waterproofing mastic texture coatings and mastic texture coatings. In addition, the Cal Coast research study sponsored by the Architectural Coatings Task Force, concluded the performance of high solids waterproofing mastic coatings was satisfactory for the current market demand and the recommendation was made to maintain a VOC limit of 300 g/l. The film thickness specification was added to the definition to make the definition more specific and reflect the fact that these coatings are applied at very high builds.

ISSUES

At a meeting with El Rap representatives subsequent to the January workshop, El Rap agreed to the proposal of consolidating the two categories and establishing a VOC limit at 300 g/l. However, we have received repeated requests from one company in California to raise the standard to 600 g/l since on high rise buildings it is very difficult to maintain a wet edge, especially on hot days. Based on our discussions with other marketers and applicators of these coatings, the problems of lap marks can be avoided with careful application techniques. We also question whether the request is truly valid or is for marketing a new higher VOC product in California, since in the 1984 survey, 98 percent of the mastic texture coatings reported had VOC contents less that 300 g/l.

13. Metallic Pigmented Coatings

RECOMMENDATION

Establish a new definition and standard for "metallic pigmented coatings:"

> Metallic Pigmented Coatings: Coatings containing at least 0.4 pound of metallic pigment per gallon of coating as applied.

Proposed VOC Limit: 500 g/l
Current VOC Limit: Exempt (Current level at about 500 g/l)

BASIS FOR RECOMMENDATION

This provision would allow the use of metallic pigmented coatings and minimize the impact on the industry. The initial proposal was to set the metal content at 0.65 g/l. We now believe that 0.65 lb/gal is too high. New York state set a level of 0.4 lb/gal in its regulation.

As far as we can determine, for metal levels below 0.4 lb/gal, there is no need for a solvent level of 500 g/l. Small jobs undertaken by the

homeowner will be permitted by the small container exemption, or will not be architectural uses.

We recommend that the TRG revisit this category in 3 years. Our investigation indicates that lower-solvent technology may be available soon.

ISSUES

One commentor suggested that we should consider lowering the metallic content to 0.1 lb/gallon. Aluminum, being a low-density metal, can be used to impart a metallic appearance and improve performance properties at much lower level, in fact at higher levels such as those in the proposed definition, leafing is inhibited. Another commentor recommended a level of 0.4 lb/gal or lower. In his company's experience, film quality suffers at levels higher than 0.4. We believe allowing 500 g/l for coating with metallic contents less than 0.4 lb/gallon is not necessary.

It was suggested we incorporate the Paint and Coatings Dictionary's definition of metallic coatings, particularly the language: "imparts a metallic appearance." We believe this change is not appropriate and could present enforcement problems since there are non-metallic pigmented coatings which import a metallic appearance

Other commentors say that the 500 g/l solvent content for metallic paints should pose no real problems for ordinary metallic paints, but will not work for heat-resistant coatings. They say that such coatings must withstand very high temperatures--up to 1000 F. The coatings do not perform well when formulated with low solvent content. They recommend a special category for high heat resistant coatings, with a VOC standard of 650 g/l, into which high heat resistant metallic pigmented coatings would fall. We have incorporated this recommendation in the Industrial Maintenance category.

While we have proposed a 500 g/l standard, we are aware of numerous coatings available with lower VOC content. For example, Cal-Trans has formulated and currently uses two-component metallic primers, with VOC content below 250 g/l, for use on bridges and other highway structures. This information suggests that revisiting this category in the future would be worthwhile.

We do not yet have a test method to use for determining the metal content of coatings. For the time being, enforcement of this portion of the rule will have to be based only on the manufacturers safety data sheet information on metallic pigment content, and on the solvent content of the coating.

14. Multi-Colored Coatings

RECOMMENDATION

Establish the multi-colored coating category at 575 g/l and reduce the standard to 420 g/l in 3 years after adoption of the rule.

Proposed VOC Limit: 575 g/l (9/1/89) 420 g/l (9/1/92)
Current VOC Limit: Exempt (Current level at about 685 g/l)

BASIS FOR RECOMMENDATION

Multi-colored coatings can be either lacquer or enamel based. The recommendation to establish this category at 575 g/l reflects current technology for the enamel based multi-colored coatings. We have spoken to three formulators of these coatings and have received information to indicate the lower-VOC technology will be available in the future. To encourage research into low-VOC, multi-colored coatings, we are proposing the standard be lowered to 420 in 3 years.

To encourage the use of lower-VOC coatings in California architectural applications and phase out high-VOC technologies such as lacquers, we propose setting a standard only for the enamel based coatings, which would effectively eliminate the use of lacquer based multi-colored coatings on architectural structures in California. Multi-colored lacquer based coatings are primarily used in line applications and not on architectural structures. However, according to one manufacturer, approximately 4,000 gallons per year are used for architectural application. Emissions resulting from this application (VOC content 685 g/l) are approximately 0.03 tons per day.

ISSUES

This proposal would eliminate the use of lacquer based multi-colored coatings as architectural coatings in California. An appeal was made by a supplier of these coatings to establish a category for lacquer based coatings and then lower the standard in 3 years. As stated above, approximately 4,000 gallons of lacquer based multi-colored coatings are used on architectural structures. Even though the emissions from this category are small, we do not think it is necessary to establish a category for the lacquer based coatings which are primarily used for decorative purposes on architectural structures.

We were also asked to create a multi-colored clear top coat category. This would be a clear coating that can be applied over the multi-colored coating to provide added protection and give a high gloss. We do not think it is necessary for this category to be included in the rule. If the coating is in a commercial or institutional area and is exposed to extreme environmental conditions, there are two component epoxies and polyurethanes that may be applied under the provisions of the industrial maintenance coating definition. We also spoke to two other manufacturers of these coatings and they do not recommend topcoating multi-colored coatings since the coatings themselves are very durable and topcoats can distort the multi-colored appearance.

15. Opaque and Semi-transparent Wood Preservatives and Opaque and Semi-transparent Stains

RECOMMENDATION

Amend definition of opaque and semi-transparent wood preservatives as follows:

> Opaque Wood Preservatives: All wood preservatives not classified as clear or semi-transparent wood preservatives or as below ground wood preservatives.
>
> Semi-transparent Wood Preservatives: Wood preservative stains formulated and used to protect exposed wood from decay or insect attack by the addition of a wood preservative chemical registered by the California Department of Food and Agriculture, which change the color of a surface but do not conceal the surface, including clear wood preservatives.

Retain two categories for both stains and wood preservatives, opaque and semi-transparent, with a solvent content limit of 350 g/l for each, as presently required in the rules of the BAAQMD, SCAQMD, and San Diego APCD.

BASIS FOR RECOMMENDATION

We believe that complying coatings are being marketed and that their performance is satisfactory. The rules of the SCAQMD, BAAQMD, and San Diego APCD, all presently have limits of 350 g/l. These limits are already approved as provisions of the State Implementation Plan (SIP). We have recently become aware of imported water-borne coatings which would overlap the semi-transparent stain and the clear wood finishes area. These coatings have VOC content of 215 g/l or less. They gave excellent finishes on small test panels shown to us. Although they are quite expensive now, prices may come down if demand picks up and spurs additional production capacity. The same resin-types are available from American resin manufacturers, but paint formulators have not developed coatings based on them.

At our January meeting with El Rap and at the February workshop, industry took the position that while they have problems with the 350 g/l standard, they would accept the proposed limits.

ISSUES

There has been a great deal of controversy over this proposed amendment. Many manufacturers claim that they are unable to manufacture satisfactory complying coatings, and disparage the quality of the few manufacturers who claim to have such coatings. While we propose to maintain the 350 g/l limit, we believe that semi-transparent wood stains and wood preservatives is an area where economic incentives would be an effective way to reduce the solvent content of coatings without severe economic dislocations. An annually increasing fee on the solvent content of coatings with VOC content above 250 g/l would provide

coatings manufacturers and users with a strong incentive to accomplish that reduction without making coatings suddenly unavailable for use where no satisfactory substitute is currently available. We anticipate that such a reduction would be accomplished by a shift in practices, and by the development of lower-solvent coatings.

One commentor says there is a serious problem with the present situation vis-avis semi-transparent stains and wood preservatives. Semi-transparent stains and wood preservatives cannot be made to work at 350 g/l VOC. Problems arise from using high linseed-oil content to get desired low viscosity and spread rate. Linseed oil does not dry in a reasonable time, and coatings remain sticky for extended periods. Result is formation of mold and adhesion of wind-blown material. Jobs have to be cleaned up, involving lots of solvent emissions, and re-coated, involving still more emissions. Opaque stains can be made to work at 350, but not semi-transparent. He recommends a limit of 500 g/l for semi-transparent stains and wood preservatives. He recommends regulating semi-transparent wood preservatives and semi-transparent stains as one category, and opaque wood preservatives and opaque stains in another. There has been no success with water-based semi-transparent stains.

Other contributors commented in person and by mail that semi-transparent stains and preservatives should be treated separately from opaque stains and preservatives. They recommend limits of 550 g/l for semi-transparent stains and wood preservatives (including clear), and 350 g/l for opaque stains and wood preservatives. They re-iterate the claims from the workshop that 350 VOC semi-transparent stains and wood preservatives perform poorly and look bad. A major problem with 350 g/l wood preservatives and stains is early and "spotty" failure. Low-solvent stains just do not last as long (as higher-VOC), and when they eventually fail, they fail in spotty patterns, requiring costly preparation of the surface for a re-coating.

Contributors also recommend a grace period for semi-transparent wood preservatives, as in the New York regulation, to allow manufacturers to submit new formulations to EPA for necessary certification.

A representative of one manufacturer said that they have marketed 350 g/l stains and preservatives, but withdrew them for poor performance. Two other companies withdrew from the California stain market because they could not formulate a 350 g/l product with adequate performance.

We have received several comments on the differences between semi-transparent and opaque wood stains and preservatives. There is no problem with formulating an opaque stain at 350. Opaque stains obscure the natural grain pattern of wood and are often used on exteriors and on lower grade softwood. Semi-transparent stains and preservatives are intended to enhance the the natural grain pattern of the wood and are usually used for interior application on harder more expensive woods. Because the semi-transparent preservatives and stains are translucent, they need to be formulated with lower solids, making 350 g/l difficult to achieve. Many contributors agreed that there are performance problems with the 350 semi-transparent stains and preservatives.

A representative of Olympic, relayed Olympic's opinion regarding the 350 g/l products they market. To date, they are very satisfied with the performance characteristics of both their semi-transparent and opaque wood stains. However, the performance of the clear wood preservative is poorer than they would like, and work is underway to improve this product. One problem with Olympic's clear wood preservative is that when it is used as an undercoat, it is difficult to paint over this coat and still have the desired appearance.

16. Pre-treatment Wash Primers

RECOMMENDATION

Establish a definition and a standard for pre-treatment wash primers, used in the preparation of bare metal surfaces for coating as follows:

> Pre-treatment Wash Primers: Coatings which contain a minimum of 1/2% acid by weight, applied directly to bare metal surfaces, to provide necessary surface etching.

Proposed VOC Limit:	780 g/l (effective 9/1/89)
	420 g/l (effective 9/1/94)
Current VOC Limit:	No current standard (Current level 420-780 g/l)

BASIS FOR RECOMMENDATION

We have received comments by mail that there is a need for such a category. This proposal is consistent with the Bay Area district's Marine Coating rule.

We are aware of two companies manufacturing low-VOC pre-treatment wash primers at the present time. Their performance is controversial. Development of lower VOC pre-treatment wash primers is currently underway and lowering of the standard in 5 years to 420 g/l should provide adequate time for evaluation of these new coatings.

ISSUES

An El Rap spokesperson stated that pre-treatment wash primers represent a very small percentage of total coating sales, less than a tenth of a percent. He recommended that if the committee decides to add pre-treatment wash primers to the rule, that "aluminum" be replaced with "metal" since these coatings are used on metals other than aluminum. Pre-treatment wash primers are often used on galvanized surfaces. A VOC limit of 780 g/l was recommended.

Another contributor added that, under normal conditions, the available lower-VOC pre-treatment wash primers do not function properly.

Cal-Trans' Materials Laboratory recommends the inclusion of a category for pre-wash primers with these limits.

17. Primers, Sealers, and Undercoater Categories

RECOMMENDATION

Consolidate the General Primer, Sealer, Undercoater categories with the Specialty Primer, Sealer, and Undercoater categories with definitions and standards as follows:

> Primers: Coatings formulated and applied to substrates to provide a firm bond between the substrate and subsequent coats.
>
> Sealers: Coatings formulated and applied to substrates to protect the substrate, to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.
>
> Undercoaters: Coatings applied to substrates to provide a smooth surface for subsequent coats.

Proposed VOC Limit: 350 g/l
Current VOC Limit: 350 g/l (General) Exempt (Specialty/Quick-Dry)

BASIS FOR RECOMMENDATION

At the second workshop we recommended establishing a blocker category at 450 g/l, sealers at 350 g/l and a primer/undercoater category at 350 g/l. This blocker category was to be a limited use category for blocking stains. However, based on further review of available technology, discussions with several manufacturers and considering amendments made to the shellac category, we are recommending a return to the first workshop proposal which consolidates the general and specialty primer, sealer, and undercoater categories into one category.

We believe technology is presently available to satisfy most primer, sealer and undercoater requirements at the 350 g/l limit. This was verified by a survey of primers, sealers, and undercoaters currently marketed in California. The results of this survey, which is presented in Table 11, demonstrates the availability of primers, sealers, and undercoaters with VOC contents in many cases well below the 350 VOC limit.

ISSUES

In recognition of the comments received to date, we are recommending further study be given to the possibility of creating temporary special use categories. Possible candidates are clear wood sanding sealers and asphalt roof primers. Categories would be created for these and other areas if additional information can be provided by the coatings industry to demonstrate that current technology cannot formulate acceptable coatings at the 350 g/l standard, and that there are no alternative surface preparation and/or application techniques to allow use of the 350 g/l product.

We also were not able to come to complete agreement with industry on this category. El Rap submitted a proposal to consolidate all architectural primers, sealers, and undercoaters into two categories: General Use Primers, Sealers, and Undercoaters, VOC Limit 350 g/l; and Special Use Primers, Sealers, and Undercoaters, VOC Limit 450 g/l. El Rap contends that alternatives for specialty coatings are not available and the current cost differential between general and specialty primers, sealers, and undercoaters would limit the abuse of the specialty category. According to El Rap, if their proposal is adopted, the need for specialty flats, waterproofing sealers, enamel undercoaters, quick-dry primers, sealers, and undercoaters (see discussion under item #19), and the proposed alkali-resistant primers would be eliminated.

We disagree with the El Rap proposal and are hesitant to create a specialty category as suggested. Very minimal emission reductions would be realized under the El Rap proposal and, as stated above under "Basis for Recommendation," we believe the technology is currently available to meet most all specialty primer, sealer, and undercoater needs. By endorsing a specialty category we would not encourage the continued use and development of alternative lower-VOC coatings.

Secondly, we forsee enforcement problems with the proposal. The "special use primer, sealer, and undercoater category" as proposed, would allow a 450 g/l standard for "difficult substrates." Difficult substrates would include "extreme gloss" and "chemical incompatibility." We believe that such a broad definition would create enforcement difficulties and could allow the use of 450 g/l coatings in areas not requiring them.

Furthermore, the 350 g/l standard for specialty primers, sealers, and undercoaters and for general primers, sealers, and undercoaters, has been in effect since September 1987, in both the Bay Area and South Coast Air Quality Management Districts. Establishment of a specialty category as defined by El Rap may constitute a relaxation in these districts.

Table 11

380 g/l Compliant Primers, Sealers and Undercoaters

Company	Product	Recommended Use
Glidden	Primer-Sealer No. 3416	Gypsum Wallboard, Composition Board, Plaster, Masonary (Dry Time: To Touch 30 Min, Recoat 2 Hours
	Block Filler No. 5317	Interior/Exterior Poured Concrete and Concrete Block (Dry Time: To Touch 1 Hour, Recoat 4Hours)
	Primecoat Oil/Alkyd No. 3651	General Purpose Exterior - Wood, Masonary, Stucco, Aluminum (Dry Time: To Touch 6-8 Hours Recoat 24 Hours)
	Insul-Aid Vapor Barrier Primer-Sealer No. 5116	For Gypsum,. Wallboard, Composition Board, Plaster, Masonry (Dry Time: To Touch 30-60 Min, Recoat 3-4 Hours)
William Zinnsser & Company	Bulls Eye 1.2.3	General Purpose Prior Sealer & Stain Blocker Interior/Exterior Metals, Masonry, Wood, Cinder Block (Dry Time: Recoat 1 Hour)
	Shieldz	Pre-Wallcovering Primer
Fuller O'Brien	220-08	Exterior Latex Wood Primer (Dry Time: To Touch 1 Hour, Recoat 4 Hours)
	220-17	Acrylic Concrete and Masonry Primer Sealer (Dry Time: To Touch 20-30 Min, Recoat 2 Hours)
	220-23	Exterior Wood and Masonry Primer (Dry Time: To Touch 1-2 Hours, Recoat 16-24 Hours)
	820-52	Exterior Latex Wood Primer (Dry Time: To Touch 1 Hour, Recoat 4 Hours)
	621-05	Blox-Rust Latex Metal Primer (Dry Time: To Touch 30-60 Min, Recoat 1Hour)
	220-02	Latex Enamel Undercoat - Interior Wood, Preprimed Metal Interior Drywall and Masonry (Dry Time: To Touch 1 Hour, Recoat 2-3 Hours)
	220-20	Pre-Tech Latex Wall Primer Sealer - Interior Drywall, Interior Unglazed Brick, CMU Block, Concrete (Dry Time: To Touch 30-60 Min, Recoat 2-4 Hours)
PPG	Sun-Proof White 70-1	Oil Type Exterior Primer - For use on New Wood and Weathered Repaint Wood Surfaces (Dry Time: Recoat 24 Hours)
	Speedhide 6-712	Water-base Inhibitive Metal Primer
	Speedhide White 6-2	Interior Latex Primer-Sealer, Sealer for Plaster, Wallboard, Brick, Cement-Masonry and Concrete (Dry Time: To Touch 30 Min, Recoat 4 Hours)
	Speedhide White 6-6	Quick Drying Enamel Undercoater, Use on Interior Wood/Metal (Dry Time: To Touch 1-2 Hours, Recoat 24 Hours)
	Speedhide White 6-9	Exterior Wood Primer (Dry Time: Dust Free 6-9 Hours, Recoat 24 Hours)
	Speedcraft 5-2	Latex Wall Primer-Sealer-For use on dry plaster, sheetrock, brick, cement-masonry, concrete. (Dry Time: To Touch 30 Min, Recoat 4 Hours)
	Speedhide 6-209	Galvanized Steel Primer
	Speedhide Latex 6-23	Stain Killing Primer-Ext/Int, Inhibits bleed through from water stains, fire smoke, cedar and redwood tannins, lipstick, crayon, ball point and felt pad inks. (Dry Time: To Touch 15 Min, Recoat 1 Hour)
Zehrung Corporation	Z-Prime II	Stain Blocking Primer-Sealer Ext/Int Surfaces (Dry Time: To Touch 30 Min, Recoat 1 Hour)
Insl-X	Aqualock	Primer-Sealer Stain Blocker Ext/Int Surfaces (Dry Time: To Touch: 15 Min, Recoat 60 Min)
Sherwin-Williams	A-100 Alkyd	Exterior Wood Primer (Dry Time: To Touch 2-4 Hours, Recoat 24-48 Hours)
Olympic	865	Wall Sealer-Coater For aged, bare, plaster, drywall, cinder and cement block.

18. Quick-dry Enamels

RECOMMENDATION:

Currently there is a coating category for Quick-Dry Enamels which has a VOC limit of 400 g/l. This amendment would eliminate this category and such coatings would fall under the non-flat coating category which has a VOC limit of 250 g/l.

BASIS FOR RECOMMENDATION:

We believe this "quick-dry" category has been used as a loophole to allow manufacturers to market non-flat coatings above the 250 g/l limit. Furthermore, the test method used to define this category is very subjective, allowing a liberal interpretation of the "quick-dry" characteristic. While we do not have detailed information about the increase in the volume of coatings sold as quick-dry between 1984 and present, industry representatives believe there has been a significant increase. When the 250 g/l VOC limit became effective in the Bay Area and San Diego districts, (1987) many companies developed compliant 250 g/l enamels and have continued to improve upon the performance and appearance of these products. Others elected to use the quick dry enamel category to continue marketing non-compliant (250 g/l) enamels. We believe it is time to remove this category from the rule. It is important to note, however, that the use of the 400 g/l enamels will not be completely eliminated by this proposal. For industrial and commercial applications that meet the requirements of the industrial maintenance category, solvent-borne enamels at or less than 420 g/l would still be available for 3 years at which time the standard would drop to 340 g/l.

ISSUES:

As written, this proposal would eliminate the quick-dry enamel category. As stated above, industrial, commercial and institutional applicators could use still use enamels that were formulated to meet the quick-dry standard of 400 g/l as long as the provisions of the industrial maintenance category were met. Residential users, both the "do it yourselfer" and the applicators at new-home construction sites, would have to apply enamels meeting the 250 g/l VOC limit.

It is El Rap's position that there is a legitimate niche for quick-dry coatings, particularly in situations where the substrate to be coated needs to be returned to service quickly such as in new-home construction or in a home, where for safety concerns, a resident would want to close the doors and windows at night. El rap suggests the following language be added to the definition to restrict the use of these coatings to where they are necessary:

> The Quick-Dry Enamel category shall be used only in those cases where the painted surface must be returned to service within the same 12 hour period for reasons of security, safety, or essential public service.

Another suggestion was made to set the standard for this category at 400 g/l for two years and then phase out this category over 2-3 years to provide time for manufacturers to perfect the 250 g/l compliant products and thereby minimize costs incurred from coating failures of the current 250 g/l formulations.

We are hesitant to retain this category or restrict the use of these coatings to "areas that need to be returned to service within 12 hours." The more restrictive definition as proposed by El Rap would be very difficult to enforce, and retention of the category with a gradual phase down would not take advantage of the currently available complying products.

We believe that the issue here is not whether or not complying coatings are available, but whether or not the performance of the enamels compliant with the 250 g/l VOC limit is adequate. It is our position that the 250 products are available, that technology is moving rapidly to perfect and improve these products, and that the performance properties of the currently available compliant (250 g/l) enamels, while not faultless, is adequate for most applications.

To the extent time allowed we investigated the availability and performance of currently available 250 g/l enamels. There are several resins available to allow formulation of 250 g/l compliant enamels. Cargill (Water Reducible Long Oil Alkyds - 57-5767), Rohm and Hass (Rhoplex HG-74 and AC-64), and Reichold (High Solid Alkyd 92-839), are resin suppliers that have resins that can be used to formulate compliant enamels. Unocol and NL Resins also have resin systems for low-VOC enamel coatings. A survey of paint company product literature also demonstrates complying products are available and this is shown in T 12. As can be seen in the table, many of the compliant enamels have dry times approaching that of the quick dry category (set to touch in 2 hours, dry hard in 8 hours, tack free in 4 hours).

In discussions with industry spokespersons, many stated that they were generally satisfied with their current formulations and that some of the problems that were experienced with the first generation of 250 g/l enamels such as blocking, yellowing of whites, and lack of gloss, have been minimized. However, there are still differences between the conventional enamels and these newer products. There is a general consensus among industry representatives that the water-based compliant enamels are, in many cases, more difficult to apply, not as glossy or hard, and take longer to dry than the conventional oil-based enamels. No company seems to have one product that has overcome all of these problems. We were also told, however, that because the demand for improved resins has increased as a result of regulations to lower the VOCs in coatings, technology is progressing very rapidly in the development of resins that will allow the formulation of enamels with improved appearance and performance properties.

It is our opinion that the consumer will be able to adjust to the new generation of non-flat coatings. As with many of the newer water b coatings, the application techniques and appearance is different than with the traditional oil based products. The proper application of

these products is often a matter of familiarity with the product, having the right tools and following the label directions. With regards to appearance, California consumers may not be able to have a high gloss kitchen, but in many cases there are good performing compliant semi-gloss and gloss enamels and even some flats that can be used in areas such as kitchens and bathrooms that have the same or similar durability as the more traditional enamel products. We also believe that the removal of the quick-dry enamel category will spur new research and development and very quickly, the current drawbacks to the 250 g/l enamels will be eliminated.

Table 12

250 g/l Compliant Enamels

Company	Product	Dry Time To Touch	Dry Time Recoat	VOC, g/l
Sherwin Williams	A-100 Latex House & Trim:			
	- Gloss (Int)	30 min	4 Hours	154-180
	- Satin (Int)	30 min	4 Hours	84-120
	888 DTM Acrylic Gloss (Int/Ext)	1 Hour	4 Hours	158-227
Pittsburg Paints	Gloss Oil (Int/Ext)	4-6 Hours	24 Hours	<250
Fuller O'Brien	Acrylic Eggshell 212-XX (Int)	30 min	24 Hours	185
	Acrylic High Gloss 213-XX (Int)	30 Min	24 Hours	207
	Acrylic Semi-Gloss 214-XX (Int)	30 Min	24 Hours	197
	Semi Gloss 215-10 (Int)	2-4 Hours	24 Hours	192
	Unika Eggshell 218-10 (Int)	30 Min	2-4 Hours	114
	Eggshell 604-XX (Int)	30 Mins	2 Hours	135
	Fullerglo Satin Enamel (Int)	2-4 Hours	-	195
Glidden	Semi Gloss No. 3700 Series (Int)	2-4 Hours	24 Hours	141
	Gloss No. 1300 Series (Int/Ext)	1-2Hours	16 Hours	<250
	Dura Gloss No. 3900 (Ext)	45 - 60 Min	16 Hors	226
Olympic	Lucite House & Trim (Ext)	30 Min	2 Hours	112
	Lucite Interior Enamel	30 Min	2 Hours	207
PPG	Speedhide Hi-Build Latex Semi-Gloss 6-507 (Int/Ext)	30 Min	24 Hours	149

Notes:

Int: Recommended for Interior Use
Ext: Recommended for Exterior Use

19. Quick-Dry Primer, Sealer, & Undercoater

RECOMMENDATION

Eliminate quick-dry primer, sealer, and undercoater categories.

BASIS FOR RECOMMENDATION

By elimination of this category, we would remove what has become a very popular loophole in the architectural coating rules. Under the old rule, the test method specified for this category does not allow for distinction between a truly "quick-dry" coating and a normal conventional coating. As such, this category has been used as a loophole for marketers to sell their high-VOC coatings. Based on discussions with paint manufacturers, we believe the number of coatings sold under the quick-dry coating category has increased after 1987, when the Bay Area, South Coast, and San Diego districts, reduced the specialty coating category to 350 g/l. Without a survey, however, we cannot verify if this indeed was the case. When the 350 g/l VOC limit for specialty coatings went into effect, there were coating formulators, who expended the time and money to generate complying specialty coatings, whereas other paint companies choose to use the quick-dry category to market their non-complying specialty primers, sealers, and undercoaters.

ISSUES

El Rap wants to retain this category or requests a specialty category with a VOC limit of 450 g/l. (See Item #17)

Based on our discussions with paint formulators, we believe that the technology is currently available to formulate primers, sealers and undercoaters at or below 350 g/l that have dry times approaching that of the quick-dry category. The dry time of a paint is not necessarily only dependent on the solvent content, but also on many of the other components in a paint formulation. By careful formulation and selection of paint components quick-dry coatings can be formulated at lower solvent content. This is reflected in the number of primers, sealers and undercoaters that comply with the 350 g/l VOC limit and still have dry times that meet or are very close to those categorized as "quick-dry". (Table 11)

20. Roof Coatings

RECOMMENDATION

Revise the roof coating definition to read as follows:

> Roof Coatings: Coatings formulated for application to exterior roofs for the primary purpose of preventing penetration of the substrate by water, or reflecting heat and reflecting ultraviolet radiation. Metallic pigmented roof coatings which qualify as

metallic pigmented coatings shall not be considered to be in this category, but shall be considered to be in the metallic pigmented coatings category.

Proposed VOC Limit: 300 g/l
Current VOC Limit: Exempt

BASIS FOR RECOMMENDATION

The definitional changes were proposed to reflect that roof coatings are applied not only to prevent penetration by water but are also used to reflect heat and light. It was necessary to remove metallic pigmented roof coatings from this category because they cannot meet the proposed 300 g/l VOC limit. These coatings require high solvent content to allow the metallic flakes to leaf or plate out horizontally, on the surface. Under the proposed architectural coating rule, metallic pigmented roof coatings would be subject to the metallic pigmented coating standard (500 g/l). The 300 g/l standard for roof coatings was chosen based on data reported to the 1984 Architectural Coatings Survey. In that survey 90% of the roof coatings reported had VOC contents of 300 g/l or less.

ISSUES

Other than suggesting a minor editorial change, workshop participants were supportive of this proposal. We are not aware of any unresolved issues pertaining to the new definition and standard for roof coatings.

21. Specialty Flat Coatings

RECOMMENDATION

Currently there is a separate definition and category for Specialty Flat coatings, with a VOC limit of 400 g/l. This amendment would eliminate this category and the solvent limit for these coatings would fall to 250 g/l, as ordinary architectural coatings, or to 350, as sealers.

BASIS FOR RECOMMENDATION

This category is unnecessary. No-one markets specialty flat coatings such. This proposal has been changed to reflect proposed changes to other categories.

ISSUES

No comments were raised concerning this changes.

22. Shellac

RECOMMENDATION

Revise the shellac definition as follows:

> Shellac: Clear or pigmented coatings formulated solely with the resinous secretion of the lac beetle ("laccifer lacca"), thinned with alcohol, and formulated to dry by evaporation without a chemical reaction.
>
> Establish the shellac category with two sub-categories; clear and pigmented shellacs with VOC limits of 730 g/l and 550 g/l, respectively.

Proposed VOC Limit:	730 g/l Clear	550 g/l Pigmented
Current VOC Limit:	Exempt (Current levels at about 730 g/l clear and 450-550 g/l pigmented)	

BASIS FOR RECOMMENDATION

The definition was modified to limit and clarify that this category pertains only to coatings formulated with the resinous secretion of the lac beetle. Specifically excluded from this definition are all synthetic resins; nitrocellulose; chemically modified natural resins, such as rosin and cellulose derivatives; and other naturally occurring resins, such as hydrocarbon resins, copal gum, and manila gum.

The proposed standards are based on currently available shellac formulations. Based on current sales information and conversations with paint applicators and shellac suppliers, we believe that shellac usage is declining in California. For many of the traditional uses of shellac - stain blocking, priming, clear wood finishing - lower-VOC alternatives are available. However, for certain applications (fire restoration work) suitable shellac substitutes are not presently available. We intend to revisit this category in three years to investigate the possibility of achieving additional emission reductions by either lowering the standard for shellac or restricting the use of shellac through a definitional change. To monitor the use of shellacs, in California, we will seek a Board resolution requiring shellac suppliers to provide yearly sales information.

ISSUES

As a general policy when revisiting the model rule we tried to eliminate resin specific categories. By retaining the shellac category, we do not encourage the continuing development or application of lower-VOC shellac substitutes. We intend to revisit this category in 3 years to establish more stringent VOC standards and/or to limit the use of shellacs to applications were there are no alternatives available.

23. Swimming Pool Coatings

RECOMMENDATION

Initially establish this category at 650 g/l and lower the standard to 340 in 2 years but allow an additional 5 year (1997) repair and maintenance provision for chlorinated rubber swimming pool coatings.

Proposed VOC Limit:	Swimming Pool	Repair Coatings
	650 g/l (9/1/89)	650 g/l (9/1/89)
	340 g/l (9/1/92)	340 g/l (9/1/97)

Current VOC Limit: Exempt (Current levels at about 620 g/l)

BASIS FOR RECOMMENDATION

Our intention is to eliminate the use of high-VOC, chlorinated rubber coatings on swimming pools in California. We believe epoxies are a suitable replacement for chlorinated rubbers. Based on discussions with several manufacturers of both swimming pool coatings and industrial coatings, epoxies are lower in VOC and superior in performance to the chlorinated rubbers. To allow time for the residential user to switch from chlorinated rubber based pool coating to an epoxy, a 5 year transition period has been provided which will allow the continued use of chlorinated rubbers for repair and maintenance of pools currently coated with chlorinated rubber coatings. We have also been informed by a leading pool paint manufacturer that several studies are currently underway to investigate additional alternatives to chlorinated rubber coatings and 7 years is adequate time for product development and testing.

ISSUES

Two of the major suppliers of chlorinated rubber based swimming pool coatings in California disagree with the proposal and do not want to chlorinated rubber based swimming pool coatings eliminated from the market. The argument was made that when compared to epoxies, chlorinated rubber based pool coatings are more easily applied by the homeowner, are less expensive, last longer and are not subject to the same degree of chalking. One company claimed that this proposal would eliminate their pool paint business.

We firmly believe that epoxies are a suitable replacement for chlorinated rubber based swimming pool coatings. Epoxies have been for over 30 years on swimming pools and in many cases have proven superior to the chlorinated rubber based coatings. The cost of epoxy is comparable to the chlorinated rubber coatings. A comparison of the cost of one companies chlorinated rubber based pool paint and epoxy paint demonstrated the cost of coating a new pool with an epoxy is only about 7% more than a chlorinated rubber. Considering the life expectancy of an epoxy is 5-8 years and that of a chlorinated rubber 2-3 years, this cost increase is offset by the longer life expectancy. We agree that chalking can be a problem with some epoxy formulations,

but chalking is not unique to epoxies. All paints will chalk to a certain degree and to what amount is dependent on many factors such as the paint formulation and the amount of exposure to direct sunlight. Since most of a swimming pool paint is submerged under water, exposure to direct sunlight is minimized and the chalking process is retarded. Also, with proper pool maintenance (regular pool filtration etc.) the chalking that does occur is removed. There also have been some promising developments into more chalk-resistant epoxy coatings.

One of the drawbacks to this proposal is the cost that will be incurred when a pool owner who currently paints a pool with chlorinated rubber based paint switches to an epoxy or other low-VOC coatings. Chlorinated rubber based paints are not compatible with epoxy coatings. Because of this, pool owners switching to epoxies will have to completely remove any existing chlorinated rubber based pool coating. This will involve sandblasting of the existing coating which can cost up to 0.75 cents per square foot. Some of this additional cost, however, is mitigated by the life expectancy of an epoxy which is up to twice as long as a chlorinated rubber coating. We have also provided seven years for the complete phase out of chlorinated rubber based pool coatings which should provide some flexibility to the homeowner who will want to switch to the epoxy coatings. One other potential disadvantage to the use of epoxy coatings by the residential users is that they are 2-component coatings. These type of coatings require the mixing of the 2 components prior to use to catalyze the reaction after which the coating must be applied within a specific time period. For epoxies, the pot life will depend upon the formulation. It is not uncommon for polyamide epoxy systems to have pot lives over 8 hours. This may prove a challenge for some homeowners not familiar with 2-component paint systems.

24. Tile Like Glaze Coatings

RECOMMENDATION

We are recommending to eliminate the tile like glaze category.

Proposed VOC Limit: Move to Industrial Maintenance 420 g/l
Current VOC Limit: Exempt (Current level at about 400 g/l)

BASIS FOR RECOMMENDATION:

We understand that the majority of end uses for these coatings are in industrial and commercial situations and the resin systems used are the same as many of the industrial maintenance coatings (2-component epoxies and polyurethanes). Therefore, the need for this type of coating can be met through the industrial maintenance coating category. There are some residential uses of these coatings, such as ceramic fixture repair, and the small container exemption is available to meet these needs.

ISSUES:

We believe the issues pertaining to tile-like-glaze have been resolved.

25. Industrial Maintenance Anti-Graffiti Coatings

RECOMMENDATION

Include a special category for anti-graffiti coatings:

> Industrial Maintenance Anti-Graffiti Coatings: Two-component clear industrial maintenance coatings formulated for and applied to exterior walls and murals to resist repeated scrubbing and exposure to harsh solvents.

BASIS FOR RECOMMENDATION

The Air Resources Board directed the inclusion of this category at its meeting on May 12, 1989, at which it considered the suggested control measure for architetctural coatings.

26. Sanding Sealers

RECOMMENDATION

Include a special category for sanding sealers for use under varnishes, as follows:

> Sanding Sealers: Clear wood coatings formulated for and applied to bare wood for sanding and to seal the wood for subsequent application of varnish. To be considered a sanding sealer a coating must be clearly labelled as such.

BASIS FOR RECOMMENDATION

The Air Resources Board directed the inclusion of this category at its meeting on May 12, 1989, at which it considered the suggested control measure for architetctural coatings.

B. ADMINISTRATIVE PROPOSALS

1. Architectural Coatings Surveys

RECOMMENDATION

We recommend that the Board adopt resolutions requiring the following surveys:

1. Beginning in 1989, require a survey of architectural coatings sales in California. Surveys should be repeated every two years.

2. Beginning in 1989, require shellac manufacturers to provide annually data on shellac sales for architectural purposes in California.

3. Beginning in 1989, require manufacturers to annually provide data on the sale of architectural coatings in quart containers in California.

4. Beginning in 1989, require manufacturers to biennually provide data on the sale of coatings in aerosol containers in California.

BASIS FOR RECOMMENDATION

Sales data is needed to evaluate the overall effectiveness of the architectural coatings rules and to determine where additional reductions may be achieved.

ISSUES

Industry was generally supportive of these recommendations.

2. Labeling-VOC Content

RECOMMENDATION

Add language to the rule to require the VOC content be displayed on the container:

> Each container of any coating subject to this rule and manufactured after (one year from the date of adoption), shall display the maximum VOC content, as applied, after any thinning recommended by the manufacturer. The VOC content shall be calculated in accordance with Section (f)(1).

BASIS FOR RECOMMENDATION

This requirement will improve the enforceability of the regulations and will improve public awareness of the air pollution associated with emissions of solvents. Currently the TRG-approved model rule does not include any such language. This amendment would incorporate the above language to require that the VOC content be displayed on containers.

ISSUES

Any change on labels is costly to the manufacturers, and takes time to effect. One manufacturer informed us that changing his labels to conform to recent changes in some architectural coatings rules had cost him $22,000, and had taken almost a year.

Space on labels is limited, and other government agencies have established labeling requirements which use space. Further, the requirements of some other government agencies are in conflict with the requirements set here (e.g. New Jersey requires the display of a statement of the "volatile organic solvent" (VOS) content of the coating). This issue of conflicting and burdensome labeling requirements imposed by different government agencies needs resolution. This resolution must involve more agencies than just the ARB.

A request was made to exclude those containers exempt under the small container exemption (proposal #12) since the VOC limits do not apply do these coatings and there is limited room on the labels.

Enforcement personnel have expressed support for this type of labeling provision. The SCAQMD currently requires labeling of VOC content for all architectural coatings sold in the district.

3. Most Restrictive VOC Limit

RECOMMENDATION:

We recommend the addition of a statement to the Model Rule to require that the most restrictive VOC limit applies when a coating meets more than one definition. We would add the following language to the rule

> If anywhere on the container of any coating listed on the table of standards, on any sticker or label affixed thereto, or in any sales or advertising literature, any indication is given that the coating may be used or is suitable for use as a coating for which a more restrictive limit is specified in the table or in Subsection (c)(1), then the most restrictive limit shall apply. This requirement does not apply to the marketing of the following coatings in the manner specified:

(i) High Temperature Industrial Maintenance Coatings, which may represented as metallic pigmented coatings for use consistent

with the definition of high temperature industrial maintenance coatings;

(ii) Metallic Pigmented Coatings, which may be recommended for use as primers, sealers, undercoaters, roof coatings, or industrial maintenance coatings;

(iii) Lacquer Sanding Sealers, which may be recommended for use as sanding sealers in conjunction with clear lacquer topcoats;

(iv) Shellacs.

BASIS FOR RECOMMENDATION:

Implementing this proposal would make it clear that a manufacturer or seller of coatings could not make or sell coatings for one application, and then advertise their use for applications with a lower-VOC limit.

Currently there is no language in the TRG-approved model rule which addresses the "most restrictive VOC limit". This amendment would include such language, which is common in districts' rules and helps ensure appropriate end-use for specialty coatings. The label on a specialty coating must specify the end use of the coating. If a manufacturer elects to market a coating that is denoted as more than one category or has more than one end use described on the label, than the more restrictive limit shall apply.

ISSUES:

It was brought to our attention that many of the paint companies who market their products in California, also distribute the same coatings in other regions. A common practice in the advertisement, of these coatings, is to place ads in magazines with nationwide distribution. Concerns were raised of the interpretation of the most restrictive limit and how this would affect these advertising practices. In response, it is not our intent that this provision apply to national advertisements but, to advertisements at the point of sale, such as coating labels, accompanying sales literature, display materials, or advertisements targeted for California such as a sales flier supplied in a local newspaper.

4. Prohibit the Solicitation of Non-complying Coatings

RECOMMENDATION

Modify the of the Applicability and Standards sections of the model rule to prohibit soliciting the use of non-complying architectural coatings.

BASIS FOR RECOMMENDATION

This change would make persons soliciting the use of non-complying coatings liable to enforcement action. Addition of this language to the

rule would protect the painting contractor who might be subject to loss of jobs to contractors who would agree to use non-complying coatings. Threatened with the loss of a job for refusal to apply a non-complying coating, a contractor could point out to the client that it is a violation of the regulation for the client to solicit the use of non-complying coatings, as well as for the contractor to apply them.

ISSUES

No comments were submitted.

5. Rule Effective Date

RECOMMENDATION

Include language in the model rule which specifies that no-one shall manufacture non-complying coatings after the date of adoption of the rule, nor sell non-complying coatings later than two years from the date of adoption of the rule.

BASIS FOR RECOMMENDATION

This proposal would allow retailers and suppliers two years to clear out non-complying stock after the adoption of the regulation.

ISSUES

It was suggested to the committee to use language similar to that used in the South Coast Rule 1113 (Architectural Coatings), so that companies are not prohibited from manufacturing non-complying coatings and selling them in areas not subject to California's architectural coating rules. Also, it was recommended to remove the restriction on selling non-complying coatings one year after the rule effective date (the initial proposal). One year is not long enough for retailers to clear their shelves of non-complying coatings. The commentor did not believe stockpiling is a valid concern. Many contributors thought that there should be no time limit on the sale of "pre-manufactured", non-complying coatings.

6. Small Business Exemption

RECOMMENDATION

Currently in the TRG-approved model rule there is language which exempts coating manufactured by a small business prior to September 1, 1984. This amendment would eliminate this exemption, as has been done in many district rules.

ISSUES

No issues were raised with respect to eliminating this provision.

7. Small Container Exemption

RECOMMENDATION

Exempt from the provisions of the rule:

> Architectural coatings supplied in and applied from containers having capacities of one liter or less.
>
> Specifically exempt: Architectural coatings sold in non-refillable aerosol containers with a capacity of one liter or less.

Require yearly survey of small container sales in California.

BASIS FOR RECOMMENDATION

This recommendation represents no change from the rules now in effect in the districts.

ISSUES

Several contributors recommended the retention of the small-container exemption with a container size of one liter. According to them, almost all of the coatings sold in small containers are stains or clear finishes for which there are no satisfactory substitutes. Most of these coatings have a very low-viscosity and a high-spread rate, and therefore, result in a very low-emission rate per unit area covered. Further, because of the very small amounts of these coatings sold, the emission reduction achieved would be very small. The small container market represents a very small fraction of the overall market.

We have been told that to change the container size would be an imposition on the industry and not necessarily achieve significant emission reductions. An informal El Rap survey revealed that most companies are selling fewer quarts now than in the past, primarily because of the greater expense of quarts. The committee was requested to retain the 1 liter exemption.

Reducing the exempt container size might have the same effect as eliminating the exemption. The small container market represents a very small fraction of the coatings market. Most manufacturers have eliminated the capacity to fill containers of less than one quart. The expense of re-tooling their lines to fill still smaller containers is not justified by the small size of the market.

Many participants added that the small containers represent a very small fraction of paint sales and are necessary for special uses.

Several contributors said they marketed coatings in 24 oz. aerosol cans and appealed to the committee to be consistent with New York architectural coating rules that have an exemption for containers less than 1 quart.

Others commented that the additional cost of multiple-quart purchases acts as an economic incentive against circumvention in that manner. However, the committee is aware of cases where purchasing four quarts solvent borne coatings is less expensive than water borne coating in gallons.

We have recently become aware of circumvention of the varnish standards (350 g/l in the three largest districts) by flooring contractors, who purchase high-solvent coatings in quart containers to avoid using water-borne coatings. The contractors claim there are problems with the water-borne coatings, such as spotting from micro-organisms. We believe that cost is at least as important a factor; water-borne floor coatings are in the range of $35.00 to $45.00 per gallon, while even purchased in quarts, the non-complying solvent-borne varnishes are in the range of $20.00 to $25.00 per gallon.

8. Storage and Disposal of VOC Containing Material

RECOMMENDATION:

Incorporate the following language into the standards section of t. rule:

All VOC containing materials shall be stored in closed containers wh not in use. In use shall include: being accessed, filled, emptied, maintained, or repaired. All VOC containing materials shall be di of in such a manner as to minimize release of VOC.

BASIS FOR RECOMMENDATION:

The current model rule does not contain provisions requiring the stor of VOC containing materials in closed containers. Nor does the ru address proper storage and disposal of VOC containing clean-up solv While it is difficult to estimate emissions from these activities, would appear to be a significant source of VOC emissions. Requiri proper storage and disposal of VOC containing materials makes sense both an air quality and a safety standpoint.

ISSUES:

This provision was added after completion of the workshop process so industry has not had an opportunity to comment on it. We do not anticipate opposition to the provision requiring storage of VOC containing materials in closed containers, when not in use.

The provision requiring "... disposed of in such a manner as to minimize release of VOC." is not specific and will require interpretation by an inspector. A technique which is currently used to dispose of VOC containing clean up material is to return them to a central location and store in a large container to allow the solids to settle out. The solvent is reused as a clean-up material. Solids are spread out on plastic and allowed to dry. The dried material is then disposed of as normal refuse.

At this time, it is not our intent to outlaw the above practice. However, we will examine this issue and determine if cost-effective alternatives exist. It is also not our intent to restrict the disposal of latex paints. While the clean-up water will contain VOC's, proper disposal, from an air quality perspective, includes evaporation or sewering of these materials. To improve the enforceability of this requirement and prevent overlapping requirements with other agencies, the committee recommends that this requirement be investigated further.

9. Definition of Volatile Organic Compounds

RECOMMENDATION:

We are recommending a statement be added to the rule to indicate that methylene chloride is in the AB1807 process and as such, may be regulated as a toxic air contaminant. The revised definition reads as follows:

"Volatile Organic Compounds (VOC): Compounds of carbon which may be emitted to the atmosphere during the application of or subsequent drying or curing of coatings subject to this rule, except methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, 1,1,1-trichloroethane, methylene chloride, trichloroflouromethane (CFC-11), dichlorodifluoromethane (CFC-12), chlorodifluoromethane (CFC-22), trifluoromethane (CFC-23), trichlorotrifluoroethane (CFC-113), dichlorotetrafluoroethane (CFC-114), and chloropentafluoroethane (CFC-115)."

BASIS FOR RECOMMENDATION:

The basis for this revision is to make the definition of VOC in the model rule consistent with the definition of VOC in many district rules.

ISSUES:

The committee's work on this definition began before the full TRG elected to consider issues associated with this definition. The TRG should be providing guidance and recommended revisions to existing VOC definitions by January 1990. Therefore, we anticipate revision to the proposed VOC definition may be necessary in the near future. Revisions to the definition may address the status of methylene chloride and chlorofluorcarbons (CFCs). Methylene chloride has recently been identified by the Air Resources Board as a toxic air contaminant pursuant to Health and Safety Code Section 39660 *et seq*. CFCs have been shown to deplete stratospheric ozone.

REFERENCES

BIBLIOGRAPHY

Archer, Wesley L., "Finishers and Paint Formulators Can Use 1,1,1-Trichloroethane," Modern Paint and Coatings, Vol 78, No 7 (1988), 43-51.

Banov, Abel, Paints and Coatings Handbook, 2nd Ed., Farmington, Michigan, Structures Publishing Company, 1978.

Barnett, J.E., "Water-Borne Epoxy Resins: A Versatile Formulating Tool," Modern Paint and Coatings, Vol 78, No 5, (1988), 56-60.

California Air Resources Board, "Testing of Low-Solvent Air Dried Force Dried and Baked Coatings for Miscellaneous Metal Parts and Products," March 24, 1988, ARB Contract #A5-166-48.

California Air Resources Board, "Testing and Evaluation of Specialty Architectural Coatings," April 3, 1987, ARB Contract #A5-166-48.

California Air Resources Board, "Results of 1984 Architectural Coatings Sales Survey," ARB/SS-86-03, July 1986.

Glancy, C.W., "New Solvents for High Solids Coatings," Modern Paint and Coatings, Vol 78, No 3, (1988) 35-44.

Goldsmith, J. "Water-based polyurethanes," American Paint and Coatings Journal, July 25, 1988, 36-44.

Green, Richard H., Ed., "Report 1988: Developments In Construction Coatings Meet Evolving Market Needs," Modern Paint and Coatings, Vol 78, No 3, (1988), 28-29.

Inzarry, Rick, "Water-borne epoxy coatings: past, present and future," American Paint anc Coatings Journal, Aug. 15, 1988, 58-64.

Kossman, Heribert, "Water-based anticorrosion paints - experience gained over more than 20 years, Part I," American Paint and Coatings Journal, Oct. 26, 1987, 39-47.

Kossman, Heribert, "Water-based anticorrosion paints - experience gained over more than 20 years, Part II," American Paint and Coatings Journal, Nov. 2, 1987, 37-43.

Lednicky, R. and Stevens, V.L., "Moisture Vapor Barrier Latex for Primers, Sealers and Undercoats," Modern Paint and Coatings, Vol 78, No 6, (1988), 62-68.

LeSota, Stanley, and others, Paints/Coatings Dictionary, Philadelphia, PA, Federation of Societies for Coatings Technology, 1978.

Massingill, John L., "Resin Modifications Lower Epoxy Coatings VOCs," Modern Paint and Coatings, Vol 77, No 12, (1987) 48-53.

Pilcher, G., "Chemical Coatings in the Eighties: Trials, Tribulations and Triumphs," Modern Paint and Coatings, Vol 78, No 6, (1988), 34-36.

Richardson, F.B., "Water-Borne Epoxy Resins: Past, Present and Future," Modern Paint and Coatings, Vol 78, No 4, (1988), 84-88.

Schneberger, Gerald L., Understanding Paint and Painting Processes, Wheaton, Ill., Hitchcock Publishing Company.

Skupinski, L. K., "Comparison of Water-Borne to Solvent-Borne Architectural Coatings Products to Establish Level of Technology Reflected in Performance and Volatile Organic Compound Content," (Thesis) Eastern Michigan University, February 23, 1987, Ypsilanti, Michigan.

Stevens, V.L., "Latexes Offer Alkali Resistance, Moisture Barrier and Tannin Block," Modern Paint and Coatings, Vol 79, No 2, (1989) 22-26.

Stoffer, J. et al., "Preparation and evaluation of alkyd resins in 1,1,1-trichloroethane," American Paint and Coatings Journal, June 8, 1987, 37-47.

WRITTEN COMMENTS ON PROPOSED CHANGES TO THE ARCHITECTURAL COATINGS RULE

	Company Name	Date of Comment
1.	South Coast Air Quality Management District	Sept. 14, 1987
2.	South Coast Air Quality Management District	May 16, 1988
3.	Caldwell	Nov. 3, 1988
4.	Gibson-Homans	Nov. 4, 1988
5.	Donnelly, Clark, Chase & Smiland	Nov. 4, 1988
6.	Mantrose-Haeuser	Nov. 7, 1988
7.	Rudd	Nov. 7, 1988
8.	Exxon	Nov. 8, 1988
9.	Monterey Bay APCD	Nov. 8, 1988
10.	Sherwin-Williams	Nov. 9, 1988
11.	Dunn-Edwards	Nov. 9, 1988
12.	Early American	Nov. 14, 1988
13.	PPG	Nov. 15, 1988
14.	Decratrend	Nov. 22, 1988
15.	Dan Gilbert	Nov. 23, 1988
16.	PPG	Nov. 23, 1988
17.	Surface Protection Industries	Nov. 28, 1988
18.	Rust-Oleum	Nov. 28, 1988
19.	Roy Anderson Paint Co.	Nov. 30, 1988
20.	Deft	Dec. 5, 1988
21.	Hill Brothers Chemical Co.	Dec. 6, 1988
22.	Chromatic Paint Corp	Dec. 8, 1988
23.	Rust-Oleum (see #17, above)	Dec. 9, 1988
24.	Dunn-Edwards Corporation	Dec. 13, 1988
25.	Chase Royston Corporation	Dec. 14, 1988
26.	Frazee	Dec. 15, 1988
27.	Amos and Associates	Dec. 19, 1988
28.	Surface Protection Industries, Inc.	Dec. 19, 1988
29.	Seymour of Sycamore Inc.	Dec. 20, 1988
30.	The Valspar Corporation	Dec. 21, 1988
31.	Hills Brothers Chemical Co.	Dec. 22, 1988
32.	Ocean Coatings, Inc.	Dec. 27, 1988
33.	TNEMEC Company, Inc.	Dec. 29, 1988
34.	Decratrend Paints	Jan. 3, 1989
35.	Western Magnesite	Jan. 3, 1989
36.	Dep. of the Navy	Jan. 4, 1989
37.	William Zinsser & Co., Inc.	Jan. 4, 1989
38.	Caldwell Paint Manufacturing Co.	Jan. 4, 1989
39.	El Rap	Jan. 9, 1989
40.	Kop-Coat, Inc.	Jan. 9, 1989
41.	Olympic	Jan. 9, 1989
42.	Tricon Group	Jan. 18, 1989
43.	Burke Chemicals	Jan. 18, 1989
44.	C. H. Cabinets	Jan. 19, 1989

45.	Newsom Company	Jan. 19, 1989
46.	Ravaco Construction - Interiors	Jan. 19. 1989
47.	Dave Bahney Painting	Jan. 19, 1989
48.	Frontrunner Homes	Jan. 19, 1989
49.	Eakins Construction Co.	Jan. 19, 1989
50.	Renaissance Construction Company	Jan. 20, 1989
51.	T & R Painting Company	Jan. 20, 1989
52.	Bruce Bacon & Co.	Jan. 20, 1989
53.	North Orange Coast Painting	Jan. 20, 1989
54.	Dial One-Nick Geris & Sons Paint Co.	Jan. 20, 1989
55.	R.L. Swartz Co.	Jan. 20, 1989
56.	Sinclair Paint Co.	Jan. 20, 1989
57.	Surface Protection Industries Inc.	Jan. 30, 1989
58.	Poet Properties	Jan. 21, 1989
59.	Ericksen Construction Co., Inc.	Jan. 21, 1989
60.	Holt Company	Jan. 23, 1989
61.	ABR Custom Painting	Jan. 23, 1989
62.	Ange & Sons Painting & Wallcovering Co.	Jan. 23, 1989
63.	Bob Hallock Painting	Jan. 23, 1989
64.	Hills Brothers Chemical Co.	Jan. 23, 1989
65.	Total Living Cabinet Co.	Jan. 24, 1989
66.	TRI County Contractors	Jan. 24, 1989
67.	Lucas Development Corp.	Jan. 24, 1989
68.	Bird Development Corp	Jan. 24, 1989
69.	D & R Painting & Decorating	Jan. 24, 1989
70.	Brian Miller	Jan. 25, 1989
71.	Daniel Lee Kirby	Jan. 25, 1989
72.	Sherwin Williams	Jan. 25, 1989
73.	In and Out Painting Co.	Jan. 25, 1989
74.	R.C. Wendt Painting Contractors	Jan. 25, 1989
75.	Fredericks/Hansen Paint Company, Inc.	Jan. 25, 1989
76.	Ameritone Paint Corporation	Jan. 26, 1989
77.	Brushworks	Jan. 26, 1989
78.	Brokers Trust Co.	Jan. 26, 1989
79.	Southcoast Cabinet Inc.	Jan. 27, 1989
80.	Kelter Corporation	Jan. 27, 1989
81.	West Coast Painting	Jan. 27, 1989
82.	TNEMEC Company, Inc.	Jan. 27, 1989
83.	Tremco	Jan. 30, 1989
84.	Jade Inc.	Jan. 30, 1989
85.	Twentynine Palms Water District	Jan. 31, 1989
86.	The Fieldstone Company	Jan. 31, 1989
87.	Smullen Construction Company	Jan. 31, 1989
88.	Glenfed Development Corp.	Jan. 31, 1989
89.	Pasadena Unified School District	Feb. 1, 1989
90.	Old Quaker Paint Company	Feb. 1, 1989
91.	Peterson PTG, Inc.	Feb. 2, 1989
92.	William Zinsser & Co., Inc.	Feb. 3, 1989
93.	Azusa Unified School District	Feb. 3, 1989
94.	Wynne Painting & Sandblasting	Feb. 3, 1989
95.	California Community Builders Inc.	Feb. 3, 1989
96.	Paul's Custom Painting	Feb. 6, 1989
97.	Spectrum Paint Corp.	Feb. 7, 1989

98.	The Valspar Corporation	Feb. 8, 1989
99.	Yrueta Drywall & Painting Co.	Feb. 8, 1989
100.	RAM-MAR Painting Inc.	Feb. 9, 1989
101.	Silva Painting Inc.	Feb. 9, 1989
102.	Mar-Lak Products Company	Feb. 10, 1989
103.	F. & S. Painting	Feb. 10. 1989
104.	Freedom Painting, Inc.	Feb. 14, 1989
105.	Al's Custom Cabinet Refinishing	Feb. 15, 1989
106.	Frazee Paint and Wallcovering	Feb. 15, 1989
107.	Textured Coatings of America, Inc.(TCA)	Feb. 15, 1989
108.	John Flores Painting, Inc.	Feb. 15, 1989
109	888 Development Company	Feb. 15, 1989
110.	Frazee Paint and Wallcovering	Feb. 16, 1989
111.	Pro Mark Painters	Feb. 16, 1989
112.	Swim' n Pool City	Feb. 18, 1989
113.	The O'Brien Corporation	Feb. 20, 1989
114.	APS Industries, Inc.	Feb. 20, 1989
115.	Southern Calif. Paint & Coatings Asso.	Feb. 20, 1989
116.	TNEMEC Company, Inc.	Feb. 20, 1989
117.	Gordon's Cabinet Shop	Feb. 20, 1989
118.	General Pool & Spa Supply	Feb. 20, 1989
119.	PPG Industries, Inc.	Feb. 21, 1989
120.	D & M Painting	Feb. 21, 1989
121.	Gillespie Brothers Painting, Inc.	Feb. 22, 1989
122.	PPG Industries, Inc.	Feb. 22, 1989
123.	Kop-Coat, Inc.	Feb. 22, 1989
124.	Dunn-Edwards Corporation	Feb. 22, 1989
125.	Crown Cabinets of Hesperia	Feb. 22, 1989
126.	Donnelly, Clark, Chase, & Smiland	Feb. 23, 1989
127.	Decratrend Paints	Feb. 24, 1989
128.	Sherwin-Williams Company	Feb. 24, 1989
129.	Hydrocote Supply Company	Feb. 1989
130.	Dunn-Edwards Corp.	Feb. 27, 1989
131.	Thompson & Formby, Inc.	Feb. 28, 1989
132.	David Seiger (painting contractor)	Feb. 1989
133.	Karl Leimbach (general contractor)	Feb. 1989
134.	Bullet Painting	Feb. 1989
135.	American Water Works Association(DRAFT)	Feb. 1989
136.	Tremco	March 2, 1989
137.	Triangle Coatings	March 20, 1989
137.	Zehrung Corporation	March 21, 1989

CONSULTATION MEETINGS

Date	Description	Location
November 9, 1988	Public Workshop	San Francisco
January 9, 1989	Public Workshop	Los Angeles
January	Devoe Coatings	Sacramento
January 23, 1989	EL RAP	Los Angeles
February 2, 1989	Rust-Oleum	Sacramento
February 8, 1989	William Zinsser & Co.	Sacramento
February 14, 1989	Zehung Corporation	Sacramento
February 16, 1989	Old Quaker Paint	Construction Site, Los Angeles
February 24, 1989	Public Workshop	Sacramento
March 7, 1989	Painting Contractors	Sacramento
March 16, 1989	Sherwin Williams	Sacramento
March 23, 1989	Azco Coatings	Sacramento
March 24, 1989	Triangle Coatings	San Francisco
March 24, 1989	Bay Area Wood Floor Coating Applicators	San Francisco

REFERENCES

Phone Conversations

COMPANY	CONTACT
Samuel Cabot Company	Bob Marini
Wirchester Polytechnic Institute	Richard Custa
Tenemec	Mike Baurer
University of Maryland	Jim Milke
Hi-Tek Polymers	George Roy
Barrett Varnish	John P.r
Polomyx Ind.	Charlie Kelliher
Triangle Coatings	Ned Kisner
E.T. Horn	Dave McGee
Goodyear	Don Hillback
Cargill	Harlan Pygman
Ameron-Protective Coatings	Willy Valdez
Olympic (Calerox)	Joan Gillham
Cook-Resins & Additives	Jim Truesdale
Insl-X-Products	
Kelley Technical Coatings	Conner Williams & Jim Isaacs
Dupont	
Henenkel Polymers Division	Frank Leo
Sinclair	James Hall
Maas & Waldstein	
Rohm & Haas	Sue Choroser
William Zinsser & Co. Inc.	James Ochs
	Bob Senior
Reichold Chemicals	William Dodd
NY State Dept. Envir. Ed.	Rick Leone
PPG	Paul Tanski
Darworth Co.	Max Azevedo
CIBA-GEIGY	Mike Preston
Caldwell Pt. Mfg.	Robert Caldwell
Zehrung Corp.	Toby
Tile Like Glass	Dan Gilbert
Flecto Co.	Steve Depetris
Texture Corp.	Kevin Worrall
Flood Company	Mike
Humbolt Paint Factory	Travi Westlund
Dunne-Edwards	Frank Peters
Cal Trans	Ray Warness
Mearl Co.	Frank Piser
Underwriter Labs	Jim Smith
Barnard Products	Earlene Henslich
Fire Research Laboratory	Steve Walker
Us Navy	Mike Chan
	Joh Toch
Hughes Paint Products Co.	Jim Lightfoot
Flamemaster Corp.	Robert Groves
Ocean Coatings	Ed Goldsmith

JPH International	Dan Louviere
Mooney Chemical	Jim Andrews
Woodcoat Products	Gretzin
Old Quaker	Gary Davis
Marlak	Ed Spierung
Jessup's Services	Marjorie Jessups
Bepex Corp.	Dave Burson
Flecto	Steve de Petris
Hill Bros. Chemical	Allen Armstrong
Basic Coatings	Brent Perrier
Perry-Austin Int'l Inc.	Judy
McCloskey Corp.	Bob Burl
Valspar	William Stewart
Olympic	Marion Braseth
Parker Pace Behr Process Corp.	
Hood Products	Eric Kasner
ICI Resins	Gary Calhoun
Pratt & Lambert	Thomas Hill
Deft	Norm Gaul
	Dan Bernard
Boberg Hardwood Floors	Mike Boberg
Pierce & Stevens	Dave Fregelette
A & L Bowling Supply	Bud
Thompson - Forinby	Keith Kellmmer
Fuller O'Brien	Patti Houle
Glidden	
Glidden	
PPG	Don Peshek & Dan Tanski
Kelly Moore	Bill
Frazee Paints	Marty Balow
Calcoat Analytical Laboratory	Pat Farley
Dow Chemical	Vi Stevens
Pro Soco	Paul Grahovac
Keeler & Long	John Newbrough
Sherwin Williams	M. Harding
XIM	Dick Hardy
Flood Co.	

Appendix A

ARB-CAPCOA Suggested Control Measure for Architectural Coatings

Appendix A

May 1989

ARB-CAPCOA Suggested Control Measure for Architectural Coatings

RULE _____ ARCHITECTURAL COATINGS

(a) APPLICABILITY

This rule is applicable to any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating, or who manufactures any architectural coating for use within the District.

(b) DEFINITIONS

(1) Appurtenances: Accessories to an architectural structure, including, but not limited to: hand railings, cabinets, bathroom and kitchen fixtures, fences, rain-gutters and down-spouts, window screens, lamp-posts, heating and air conditioning equipment, other mechanical equipment, large fixed stationary tools and concrete forms.

(2) Architectural Coatings: Coatings applied to stationary structures and their appurtenances, to mobile homes, to pavements, or to curbs.

(3) Below-Ground Wood Preservatives: Coatings formulated to protect below-ground wood from decay or insect attack and which contain a wood preservative chemical registered by the California Department of Food and Agriculture.

(4) Bituminous Coatings: Black or brownish coating materials which are soluble in carbon disulfide, which consist mainly of hydrocarbons, and which are obtained from natural deposits or as residues from the distillation of crude oils or of low grades of coal.

(5) Bond Breakers: Coatings applied between layers of concrete to prevent the freshly poured top layer of concrete from bonding to the layer over which it is poured.

(6) Clear Wood Finishes: Clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a transparent or translucent solid film.

(7) Concrete Curing Compounds: Coatings applied to freshly poured concrete to retard the the evaporation of water.

(8) Dry Fog Coatings (Mill White Coatings): Coatings formulated only for spray application such that overspray droplets dry before subsequent contact with other surfaces.

(9) Exempt Solvents: Compounds identified as exempt under the definition of Volatile Organic Compounds, Subsection (b)(38).

(10) Fire-Retardant Coatings: Coatings which have a flame spread index of less than 25 when tested in accordance with ASTM Designation E-84-87, "Standard Test Method for Surface Burning Characteristics of Building Material," after application to Douglas fir according to the manufacturer's recommendations.

(11) Form-Release Compounds: Coatings applied to a concrete form to prevent the freshly poured concrete from bonding to the form. The form may consist of wood, metal, or some material other than concrete.

(12) Graphic Arts Coatings (Sign Paints): Coatings formulated for and hand-applied by artists using brush or roller techniques to indoor and outdoor signs (excluding structural components) and murals, including lettering enamels, poster colors, copy blockers, and bulletin enamels.

(13) High-Temperature Industrial Maintenance Coatings: Industrial Maintenance Coatings formulated for and applied to substrates exposed continuously or intermittently to temperatures above 400 degrees Fahrenheit.

(14) Industrial Maintenance Anti-Graffiti Coatings: Two-component clear industrial maintenance coatings formulated for and applied to exterior walls and murals to resist repeated scrubbing and exposure to harsh solvents.

(15) Industrial Maintenance Coatings: High performance coatings formulated for and applied to substrates in industrial, commercial, or institutional situations that are exposed to one or more of the following extreme environmental conditions:

(i) immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;
(ii) acute or chronic exposure to corrosive, caustic or acidic agents, or to chemicals, chemical fumes, chemical mixtures, or solutions;
(iii) repeated exposure to temperatures in excess of 250 F;
(iv) repeated heavy abrasion, including mechanical wear and repeated scrubbing with industrial solvents, cleansers, or scouring agents; or
(v) exterior exposure of metal structures.

Industrial Maintenance Coatings are not for residential use or for use in areas of industrial, commercial, or institutional facilities such as office space and meeting rooms.

(16) Lacquers: Clear wood finishes formulated with nitrocellulose or synthetic resins to dry by evaporation without chemical reaction, including clear lacquer sanding sealers.

(17) Magnesite Cement Coatings: Coatings formulated for and applied to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

(18) Mastic Texture Coatings: Coatings formulated to cover holes and minor cracks and to conceal surface irregularities, and applied in a thickness of at least 10 mils (dry, single coat).

(19) Metallic Pigmented Coatings: Coatings containing at least 0.4 pounds of metallic pigment per gallon of coating as applied.

(20) Multi-Colored Coatings: Coatings which exhibit more than one color when applied and which are packaged in a single container and applied in a single coat.

(21) Opaque Stains: All stains that are not classified as semi-transparent stains.

(22) Opaque Wood Preservatives: All wood preservatives not classified as clear or semi-transparent wood preservatives or as below-ground wood preservatives.

(23) Pre-treatment Wash Primers: Coatings which contain a minimum of 1/2% acid by weight, applied directly to bare metal surfaces to provide necessary surface etching.

(24) Primers: Coatings formulated and applied to substrates to provide a firm bond between the substrate and subsequent coats.

(25) Residential Use: Use in areas where people reside or lodge including, but not limited to single and multiple family dwellings, condominiums, mobile homes, apartment complexes, motels, and hotels.

(25) Roof Coatings: Coatings formulated for application to exterior roofs and for the primary purpose of preventing penetration of the substrate by water, or reflecting heat and reflecting ultraviolet radiation. Metallic pigmented roof coatings which qualify as metallic pigmented coatings shall not be considered to be in this category, but shall be considered to be in the metallic pigmented coatings category.

(27) Sanding Sealers: Clear wood coatings formulated for and applied to bare wood for sanding and to seal the wood for subsequent application of varnish. To be considered a sanding sealer a coating must be clearly labelled as such.

(28) Sealers: Coatings formulated for and applied to a substrate to prevent subsequent coatings from being adsorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.

(29) Semi-Transparent Stains: Coatings formulated to change the color of a surface but not conceal the surface.

(30) Semi-Transparent Wood Preservatives: Wood preservative stains formulated and used to protect exposed wood from decay or insect attack by the addition of a wood preservative chemical registered by the California Department of Food and Agriculture, which change the color of a surface but do not conceal the surface, including clear wood preservatives.

(31) Shellacs: Clear or pigmented coatings formulated solely with the resinous secretions of the lac beetle (laccifer lacca), thinned with alcohol, and formulated to dry by evaporation without a chemical reaction.

(32) Solicit: To require for use or to specify, by written or oral contract.

(33) Swimming Pool Coatings: Coatings formulated and used to coat the interior of swimming pools and to resist swimming pool chemicals.

(34) Swimming Pool Repair Coatings: Chlorinated rubber based coatings used for the repair and maintenance of swimming pools over existing chlorinated rubber based coatings.

(35) Traffic Coatings: Coatings formulated for and applied to public streets, highways, and other surfaces including, but not limited to curbs, berms, driveways, and parking lots.

(36) Undercoaters: Coatings formulated and applied to substrates to provide a smooth surface for subsequent coats.

(37) Varnishes: Clear wood finishes formulated with various res to dry by chemical reaction on exposure to air.

(38) Volatile Organic Compounds (VOC): Compounds of carbon which be emitted to the atmosphere during the application of and or subsequent drying or curing of coatings subject to this rule, except methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates ammonium carbonate, 1,1,1-trichloroethane, methylene chloride, trichlorofluoromethane (CFC-11), dichlorodifluoromethane (CFC-12), chlorodifluoromethane (CFC-22), trifluoromethane (CFC-23), trichlorotrifluoroethane (CFC-113), dichlorotetrafluoroethane (CFC-114) chloropentafluorethane (CFC-115).

(39) Waterproofing Sealers: Colorless coatings which are formul and applied for the sole purpose of protecting porous substrates by preventing the penetration of water and which do not alter surface appearance or texture.

(c) STANDARDS

(1) Except as provided in Subsections (c)(2), (c)(3), and (c)(4), no person shall, within the District, supply, offer for sale, sell, apply, or solicit the application of any architectural coating which, at the time of sale or manufacture, contains more than 250 grams of volatile organic compounds per liter of coating (less water and exempt solvents, and excluding any colorant added to tint bases), or manufacture, blend, or repackage such a coating for use within the District.

(2) Except as provided in Subsections (c)(3) and (c)(4), no person shall, within the District, supply, offer for sale, sell, apply, or solicit the application of any architectural coating listed in the Table of Standards which contains volatile organic compounds (less water and exempt solvents, and excluding any colorant added to tint bases) in excess of the corresponding limit specified in the table, after the corresponding date specified, or manufacture, blend, or repackage such a coating for use within the district.

Table of Standards
(grams of VOC per liter)

	Effective Dates			
	9/1/84	9/1/89	9/1/92	9/1/94
Below-Ground Wood Preservatives	--	600	350	
Bond Breakers	--	750	350 (9/1/90)	
Clear Wood Finishes				
Lacquer	--	680		
Sanding Sealers		550	350	
Varnish	500	350		
Concrete Curing Compounds	--	350		
Dry Fog Coatings		400		
Fire-Retardant Coatings				
Clear	--	650		
Pigmented	--	350		
Form-Release Compounds	--	250		
Graphic Arts (Sign) Coatings	--	500		
Industrial Maintenance Coatings	--	420	340	
Industrial Maintenance Anti-Graffitti Coatings	--	600	340	
High Temperature Industrial Maintenance Coatings	--	650	550	420
Magnesite Cement Coatings	--	600	450	
Mastic Texture Coatings	--	300		
Metallic Pigmented Coatings	--	500		
Multi-Color Coatings	--	580	420	
Opaque Stains	400	350		
Opaque Wood Preservatives	400	350		
Pre-treatment Wash Primers	--	780	780	420
Primers Sealers & Undercoaters	400	350		
Roof Coatings	--	300		
Semi-transparent Stains	--	350		
Semi-transparent and Clear Wood Preservatives	--	350		
Shellac				
Clear	--	730		
Pigmented	--	550		
Swimming Pool Coatings	--	650	340 (9/1/92)	
Repair and Maintenance Coatings	--	650	340 (9/1/97)	
Traffic Paints				
Public streets & highways	415	250		
Other surfaces	250	250		
Black traffic coatings	--	250		
Waterproofing Sealers	--	400		

(3) If anywhere on the container of any coating listed on the Table of Standards, on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the coating may be used as, or is suitable for use as a coating for which a lower VOC standard is specified in the table or in Subsection (c)(1), then the lowest VOC standard shall apply. This requirement does not apply to the representation of the following coatings in the manner specified:

(i) High-Temperature Industrial Maintenance Coatings, which may be represented as metallic pigmented coatings for use consistent with the definition of high temperature industrial maintenance coatings;
(ii) Lacquer Sanding Sealers, which may be recommended for use as sanding sealers in conjunction with clear lacquer topcoats;
(iii) Metallic Pigmented Coatings, which may be recommended for use as primers, sealers, undercoaters, roof coatings, or industrial maintenance coatings; and
(iv) Shellacs.

(4) Sale of a coating manufactured prior to the effective date of the corresponding standard in the Table of Standards, and not complying with that standard, shall not constitute a violation of Subsection (c)(2) until three years after the effective date of the standard, nor shall application of such a coating.

(5) All VOC-containing materials shall be stored in closed containers when not in use. In use includes, but is not limited to: being accessed, filled, emptied, maintained or repaired.

(d) ADMINISTRATIVE REQUIREMENTS

(1) Each container of any coating subject to this rule shall display the date on which the contents were manufactured or a code indicating the date of manufacture. Each manufacturer of such coatings shall file with the Air Pollution Control Officer and the Executive Officer of the California Air Resources board, an explanation of each code.

(2) Each container of any coating subject to this rule shall display a statement of the manufacturer's recommendation regarding thinning of the coating. This recommendation shall not apply to the thinning of architectural coatings with water. The recommendation shall specify that the coating is to be employed without thinning or diluting under normal environmental and application conditions unless any thinning recommended on the label for normal environmental and application conditions does not cause a coating to exceed its applicable standard.

(3) Each container of any coating subject to this rule and manufactured after (one year from the date of adoption) shall display the maximum VOC content of the coating, as applied, and after any thinning as recommended by the manufacturer. VOC content shall be displayed as grams of VOC per liter of coating (less water and exempt solvent, and excluding any colorant added to tint bases). VOC content displayed may be calculated using product formulation data, or may be determined using the test method in Subsection (f)(1).

(4) Beginning (one year from the date of adoption), the labels of all industrial maintenance coatings shall include the statement "Not for Residential Use," or "Not for Residential Use in California," prominently displayed.

(e) EXEMPTIONS

The requirements of this rule do not apply to:

(1) Architectural coatings manufactured for use outside of the District or for shipment to other manufacturers for repackaging.

(2) Architectural coatings supplied in and applied from containers having capacities of one liter or less, which were offered in containers of such capacities prior to (the date of adoption of this rule).

(3) Architectural coatings sold in non-refillable aerosol containers having capacities of one liter or less.

(4) Emulsion-type bituminous pavement sealers.

(f) TEST METHODS

(1) Volatile Organic Compounds: Measurement of volatile organic compounds in architectural coatings shall be conducted and reported in accordance with EPA Test Method 24 (40 CFR 60, Appendix A), or an equivalent method approved by the air pollution control officer.

Appendix B

ARCHITECTURAL COATING WORKSHOP ANNOUNCEMENTS

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

AIR RESOURCES BOARD
1102 Q STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

October 7, 1988

Dear Sir or Madam:

Statewide Workshop to Discuss Changes to Architectural Coatings Rules

In an effort to develop recommendations to improve the clarity, enforceability, and effectiveness of local air pollution control districts' architectural coatings rules in California, the statewide Technical Review Group (TRG) has established an Architectural Coatings Committee (Committee).

The Committee is comprised of representatives from the California Air Resources Board (ARB), the U.S. Environmental Protection Agency, the South Coast Air Quality Management District, the Bay Area Air Quality Management District, and the San Diego County Air Pollution Control District.

The Committee has been charged with revisiting the TRG-approved model architectural coatings rule and recommending amendments to that rule. The Committee has developed proposed recommended changes. The next step is for the Committee to hold a workshop to solicit input from the architectural coatings industry and other interested individuals regarding these recommendations. This will be an opportunity for interested persons to provide input into the development of the amendments. The amendments will be recommended to the TRG for approval after the comments from this workshop are taken into consideration.

The time and place of the workshop are as follows:

Date: November 9, 1988

Time: 10:00 a.m.

Place: San Francisco State Building
455 Golden Gate Avenue
San Francisco, California 94102

Enclosed is a copy of the Committee's proposed recommended amendments which will be discussed at the workshop. If you have any questions, please call Dan Donohoue at (916) 322-8283 or Peggy Vanicek at (916) 445-6426.

Sincerely,

Ronald A. Friesen
Assistant Division Chief
Stationary Source Division
Secretary, Technical Review Group

Enclosure

STATE OF CALIFORNIA

GEORGE DEUKMEJIAN, Governor

AIR RESOURCES BOARD
1102 Q STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

December 6, 1988

Dear Sir or Madam:

Public Workshops to Discuss Draft Changes to Architectural Coatings Rules

To improve the clarity, enforceability, and effectiveness of local air pollution control districts' architectural coatings rules in California, the statewide Technical Review Group (TRG) has established an Architectural Coatings Committee (Committee). The Committee is comprised of representatives from the California Air Resources Board (ARB), the U.S. Environmental Protection Agency, the South Coast Air Quality Management District, the Bay Area Air Quality Management District, and the San Diego County Air Pollution Control District.

The Committee is charged with revisiting the TRG-approved suggested control measure for architectural coatings to identify possible amendments to improve that measure. As part of that process, the committee decided to hold three public workshops to solicit input from the architectural coatings industry and others regarding possible changes to the measure.

The workshops are an opportunity for interested persons to provide input into the development of the amendments. Those interested in the topics presented in the attached document are urged to attend a workshop. Otherwise, you may miss a valuable discussion of subjects that could influence revisions to architectural coatings rules in California.

The first workshop to discuss 24 preliminary recommendations was held November 9, 1988 in San Francisco. The committee has modified the preliminary recommendations and will hold the second workshop to discuss these revised recommendations.

The time and place of the second workshop are:

Date: January 9, 1989

Time: 10:00 a.m.

Place: California Museum of Sciences and Industry
Armory Bldg., Muses Room
Exposition Park
700 State Drive
Los Angeles, CA 90037

A third workshop will be held to discuss the Committee's final recommendations to the TRG.

The time and place of the third workshop are:

Date: February 24, 1989

Time: 10:00 a.m.

Place: Employment Development Dept. Bld.
722 Capitol Mall, Room 1098
Sacramento, CA 95814

Enclosed is a copy of the Committee's most recent proposed amendments, which will be discussed at the two remaining workshops.

After the comments from these workshops are taken into consideration, the Committee will recommend to the TRG what amendments they believe appropriate to the suggested control measure.

If you have any questions, please call Dan Donohoue, Manager of the ARB's Solvents Section, at (916) 322-8283.

Sincerely,

Dean C. Simeroth, Chief
Criteria Po lutants Branch

Enclosure

STATE OF CALIFORNIA

George Deukmejian, Governor

AIR RESOURCES BOARD
1102 Q STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

February 10,1989

Dear Sir or Madam:

Public Workshop to Discuss Changes to Architectural Coatings Rules

To improve the clarity, enforceability, and effectiveness of local air pollution control districts' architectural coatings rules in California, the statewide Technical Review Group (TRG) has established an Architectural Coatings Committee (Committee). The Committee is comprised of representatives from the Air Resources Board (ARB), the U.S. Environmental Protection Agency, the South Coast Air Quality Management District, the Bay Area Air Quality Management District, and the San Diego County Air Pollution Control District.

The Committee is charged with revisiting the TRG-approved suggested control measure for architectural coatings to identify possible amendments to improve that measure. As part of that process, the committee has already held two of three public workshops to solicit input from the architectural coatings industry and others regarding the amendments. The workshops provide the opportunity for interested persons to participate in the development of the amendments.

As announced December 6, 1988, the time and place of the third workshop is:

Date: February 24, 1989

Time: 10:00 a.m.

Place: Employment Development Department Bldg.
722 Capitol Mall, Room 1098
Sacramento, California 95814

I have enclosed a copy of the Committee's latest proposals, which will be discussed at the workshop, an agenda for the workshop, and a table of the Committee's estimates of the emission reductions to be gained by implementing the proposed amendments. The estimates are based on the sales volumes reported in ARB's 1984 architectural coatings survey, and on the assumption that all non-complying coatings in each category will be replaced by coatings containing the maximum amount of solvent permitted by the proposed amendment.

If you have any questions, please call Dan Donohoue, Manager of the Solvents Section, at (916) 322-8283.

Sincerely,

Dean C. Simeroth, Chief
Criteria Pollutants Branch

Enclosures