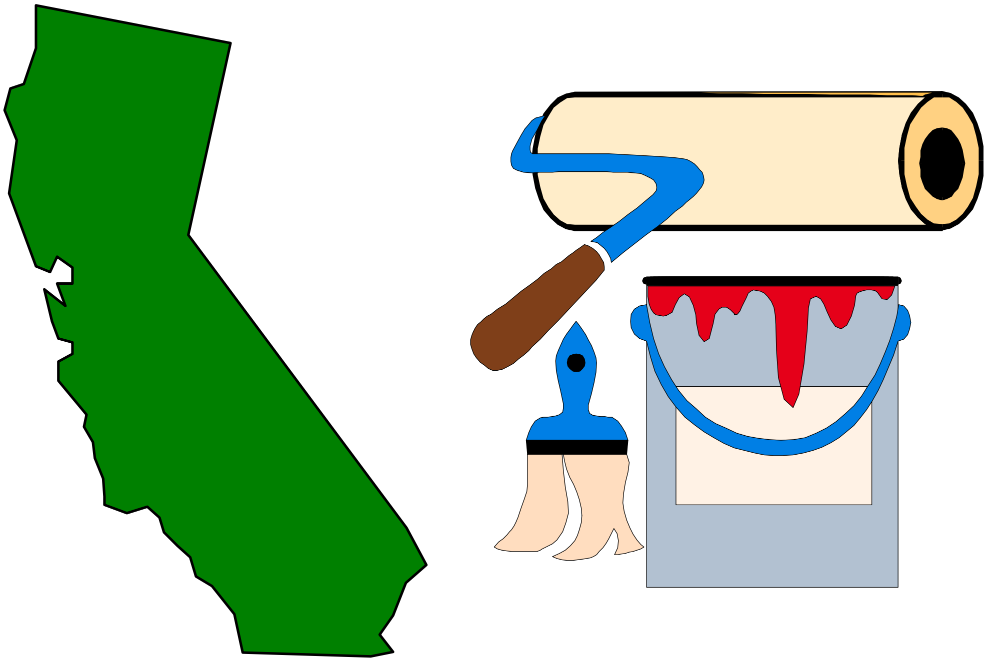
FINAL PROGRAM ENVIRONMENTAL IMPACT REPORT

Suggested Control Measure for Architectural Coatings

SCH No. 99062093



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California Environmental Protection Agency

Air Resources Board

State of California
AIR RESOURCES BOARD

FINAL PROGRAM ENVIRONMENTAL IMPACT REPORT FOR:

SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

SCH No. 99062093

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We would like to extend our appreciation to the South Coast Air Quality Management District staff for their assistance. Special thanks go to Mr. Darren Stroud. We would also like to extend our appreciation to the California Air Pollution Control Officers Association Architectural Coatings Working Group.

Notes regarding differences between the Draft Program Environmental Impact Report (EIR) and the Final Program EIR:

Proposed changes that differ from the Draft Program EIR are presented in strikeout-underline format. Text that has been added to the Final Program EIR is shown in underline, and text that has been deleted is shown in ~~strikeout~~.

Appendix D, Description and Technical Assessment of the Coating Categories, now appears as Chapter VI of the *Staff Report for the Proposed Suggested Control Measure for Architectural Coatings.*

Appendix E, Summary Tables of Coating Characteristics, has been replaced in its entirety for clarity.

Appendix H, CAPCOA Summary of Air Districts' Significance Criteria, and Appendix I, Comments on the Draft Program EIR and Reponses to Comments, are new to the Final Program EIR.

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LEGAL AUTHORITY AND EXECUTIVE SUMMARY

A. INTRODUCTION

Architectural coatings are coatings applied to stationary structures and their appurtenances, and include such coatings as house paints, stains, industrial maintenance coatings, and traffic coatings.[1] The use of architectural coatings in California results in substantial emissions of volatile organic compounds (VOCs), which contribute to the formation of ozone and particulate matter (PM). These two pollutants pose ~~the~~ California's most serious air quality problems.

Control of emissions from architectural coatings is primarily the role of the local air pollution control districts and air quality management districts (districts). Widespread regulation of architectural coatings began in 1977, when the Air Resources Board (ARB) adopted a Suggested Control Measure (SCM) for architectural coatings. Many districts adopted architectural coatings rules based on this SCM and on revisions to the SCM in 1985 and 1989. Currently, 17 of California's 35 districts have adopted architectural coatings rules. Given the advances in coatings technologies over the past 10 years, and given the need for further emission reductions to attain health-based air quality standards in many districts, the ARB, in cooperation with the districts, has reviewed the VOC content limits in the 1989 SCM and current district rules. The outcome of this review was the proposal of a new SCM.

In accordance with the California Environmental Quality Act (CEQA) (California Public Resources Code §§21000 *et seq.*), the ARB is the lead agency and has prepared a ~~Draft~~ Final Program Environmental Impact Report (EIR) for the architectural coatings SCM. The EIR includes an analysis of environmental impacts that could potentially result from implementation of architectural coatings rules based on the SCM throughout California.

A Notice of Preparation and Initial Study (NOP/IS) for this ~~Draft~~ Final Program EIR (included herein as Appendix B) was distributed to responsible agencies and interested parties for a 30-day review and comment period ending July 22, 1999. The NOP/IS identified potential adverse impacts for the following environmental topics: air quality, water, public services, transportation/circulation, solid waste/hazardous waste, and hazards. The ARB received 23 comment letters during the public comment period. Additionally, ARB received one comment letter on the NOP/IS outside the 30-day comment period. CEQA related comments were also received during a public workshop/CEQA Scoping Meeting held on July 1, 1999. ARB staff's responses to the CEQA related comments submitted on the NOP/IS, as well as comments provided at the CEQA Scoping Meeting, are presented in Appendix C of this ~~Draft~~ Final Program EIR. The *Staff Report for the Proposed Suggested Control Measure for Architectural*

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[1] An exact definition of "architectural coatings" can be found in the text of the Suggested Control Measure (Appendix A of this ~~Draft~~ Final Program EIR).

Coatings is incorporated by reference as part of this *Final Program Environmental Impact Report for the Suggested Control Measure for Architectural Coatings.*

The Draft Program EIR was distributed to responsible agencies and interested parties for a 45-day review and comment period ending April 7, 2000. The Draft Program EIR contained a detailed discussion on the environmental impacts of the proposed project on air quality, water, public services, transportation/circulation, solid waste/hazardous waste, and hazards. The ARB received 22 comment letters from 18 different commenters during the comment period. Additionally, ARB received three comment letters after the 45-day comment period. CEQA-related comments were also received during a public workshop held on March 16, 2000. The ARB staff's responses to comments submitted on the Draft Program EIR during the comment period are presented in Appendix I of the Final Program EIR. Chapter VI of the Staff Report also contains responses to comments that were made regarding the SCM, but do not specifically relate to the Draft Program EIR.

B. LEGAL AUTHORITY

California law establishes a comprehensive air pollution control program, which is set forth in Division 26 of the Health and Safety Code. Under this program, the responsibility for controlling air pollution in California is shared by the ARB and the local districts. The districts have the primary legal responsibility, subject to ARB oversight, to adopt control measures for nonvehicular sources of air pollution, including architectural coatings (Health and Safety Code §§39002, 40000, 40001, and 40702).

The ARB has the responsibility to adopt control measures for vehicular sources of air pollution (Health and Safety Code §§39002 and 40000), and has also been assigned numerous other duties by the California Legislature. Among these duties, the ARB is charged with coordinating efforts to attain and maintain ambient air quality standards, and to conduct research into the causes of and solution to air pollution (Health and Safety Code §39003); to provide technical assistance to the districts when appropriate (Health and Safety Code §§39605 and 40916); to coordinate, encourage, and review the districts' efforts to attain and maintain air quality standards (Health and Safety Code §§39500 and 41500); and to do such acts as may be necessary for the proper execution of the powers and duties to, and imposed upon, the ARB by Division 26 of the Health and Safety Code and any other provision of law (Health and Safety Code §39600). To fulfill these statutory mandates, the ARB often provides guidance and other assistance to the districts, including the development of model rules, such as the Suggested Control Measure for Architectural Coatings.

C. PREPARATION OF A ~~DRAFT~~ FINAL PROGRAM ENVIRONMENTAL IMPACT REPORT

Both CEQA and ARB policy require the ARB to evaluate the potential adverse environmental impacts of proposed projects. CEQA also requires that methods to reduce or avoid identified significant adverse environmental impacts of a project be implemented if feasible. The purpose of the ~~Draft~~ Final Program EIR is to inform public agencies and interested parties of potentially significant adverse environmental impacts associated with the implementation of the proposed project.

California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report, once the Secretary of the Resources Agency has certified the regulatory program. The Secretary of the Resources Agency has certified the portion of the ARB's regulatory program "... which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans to be used in the regulatory program for the protection and enhancement of ambient air quality in California" (see title 14, California Code of Regulations (CCR), §15251(d)). The adoption of the SCM is within the scope of this certification, which would allow the ARB to include the environmental analysis for the SCM in an ARB staff report instead of preparing a formal environmental impact report or negative declaration (see title 17, CCR, §§60005 to 60007).

Instead of placing the environmental analysis in an ARB staff report, however, the ARB believes that a Program EIR format would be more useful to districts that choose to adopt the SCM. When a district decides to adopt the SCM as a local district rule, the district will need to determine how to comply with CEQA. One possibility would be for each district to prepare its own new project EIR for the district version of the SCM. But a new project EIR prepared by each district would require a large expenditure of resources, and would likely substantially duplicate the ARB's environmental impact analysis for what is essentially the same project. To avoid such duplication, the CEQA Guidelines (see title 14, CCR, §15168) allow a lead agency to prepare a Program EIR for a series of actions that can be characterized as one large project and are related either: (1) geographically, (2) as logical parts in a chain of contemplated actions, or (3) in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program.

For projects such as the ARB's SCM, which is specifically designed to be subsequently adopted by the districts as local district rules, an environmental analysis in the form of a Program EIR provides the CEQA framework that can be relied upon by the districts when adopting ARB's SCM. Under the general principles of CEQA, the districts may use a similar environmental assessment prepared under the ARB's certified regulatory program in the same way that a Program EIR could be used. However, the precedent of using a Program EIR for this purpose is more clearly established in the CEQA Guidelines and case law, and the Program EIR format may be more familiar to the districts and the regulated community. For this particular SCM, it is important that the districts be provided with an environmental analysis format that will be consistent with, and more easily incorporated into, their own CEQA compliance process. Using a Program EIR format will accomplish this goal.

In preparing this ~~Draft~~ Final Program EIR for the ARB's SCM, the ARB has followed the procedural and substantive requirements for a Program EIR even though the ARB is not legally required to use this particular format. This ~~Draft~~ Final Program EIR has specifically and comprehensively addressed the environmental impacts associated with the Architectural Coatings SCM in accordance with CEQA, so that the districts, if they choose to do so, may rely on the analysis in the Program EIR when adopting or amending their architectural coatings rules.

The ARB intends that each district may rely on the Program EIR by incorporating it by reference in whatever CEQA documents a district chooses to prepare for its own architectural coatings rule. For example, a district could use the ARB's SCM Program EIR to provide the basis for an initial study for determining whether the district's version of the SCM may have any significant effects (see title 14, CCR §15168(d)). The district might then decide to prepare a negative declaration (if the district believes that the Program EIR appropriately analyzes the environmental impacts of adopting the SCM in that district), or a focused EIR (if, for example, the district believes that additional analysis may be necessary beyond the analysis contained in the Program EIR, in order to address factors that are specific to the individual district and may not have been fully considered in the Program EIR). These examples are not intended to dictate how a district may use the ARB's SCM Program EIR. It will be up to each district to decide on the best way to comply with CEQA in their particular circumstances. The ARB's SCM Program EIR will simply be available for whatever use the district feels is appropriate.

D. EXECUTIVE SUMMARY

The organization of this ~~Draft~~ Final Program EIR is as follows: Chapter I – Legal Authority and Executive Summary; Chapter II – Project Description; Chapter III – Existing Setting; Chapter IV – Environmental Impacts and Mitigation Measures; and Chapter V – Project Alternatives. The following subsections briefly summarize the contents of each chapter.

1. Summary of Chapter I – Legal Authority and Executive Summary

This chapter contains a discussion of the legal authority of the ARB to adopt SCMs as guidance to local districts. It also provides the basis for preparing a ~~Draft~~ Final Program EIR. This chapter also provides a summary of the contents of each chapter.

2. Summary of Chapter II – Project Description

In addition to including a description of the project location, Chapter II also includes a brief description of the SCM. Briefly, the primary objective of the proposed SCM is to provide a model rule for use by the local air districts, and to set VOC limits and other requirements that are feasible (based on existing and currently developing coatings technology) and that will achieve significant reductions in VOC emissions from architectural coatings. The SCM is also intended to improve the clarity and enforceability of existing district architectural coatings rules and provide a basis for uniformity among architectural coatings rules in California. The proposed project is essentially a model rule (*i.e.*, a SCM) that is designed to reduce VOC emissions from architectural coatings. The proposed SCM sets allowable VOC content limits for a number of architectural coatings categories, including categories such as flats, nonflats, industrial maintenance, lacquers, floor, roof, rust preventative, stains, and primers, sealers, and undercoaters. The proposed VOC limits would become effective on January 1, 2003 (January 1, 2004, for industrial maintenance coatings).

For a complete description of the SCM, the reader is referred to Appendix A.

3. Summary of Chapter III – Existing Setting

Chapter III includes descriptions of those environmental areas that might possibly be adversely affected by implementing architectural coatings rules based on the SCM. The following subsections briefly describe the existing settings for these environmental areas.

a. Air Quality

Over the last decade and a half, California's air quality has improved significantly. Nevertheless, a majority of the air basins in California still exceed the State and federal air quality standards for two pollutants of concern—ozone and particulate matter. To protect California's population from the harmful effects of both of these pollutants, federal and State air quality standards have been set for ozone and PM_{10} (particulate matter less than 10 microns equivalent aerodynamic diameter). While no State or federal ambient air quality standards have been set for VOCs because they are not classified as criteria pollutants, VOCs are regulated because they contribute to the formation of both ozone and PM_{10}. Numerous VOCs have also been identified as toxic air contaminants and are regulated through the ARB's Toxic Air Contaminant Control Program.

The California Clean Air Act requires districts that have been designated nonattainment for the State ambient air quality standard for ozone to prepare and submit plans for attaining and maintaining the standard. In addition, the federal Clean Air Act requires districts designated nonattainment for the federal ambient air quality standards to prepare air quality management plans to demonstrate attainment with the federal standards. In some districts, substantial additional emission reductions will be necessary if attainment is to be achieved.

This section in Chapter III also provides a summary of the health effects of ozone and PM_{10}, as well as a discussion of regional air quality and climate.

b. Water

The Department of Water Resources estimates that California's total water demand, based on the planning year 1995, is approximately 80 million acre feet (maf)[2] (about 25 trillion gallons) in average years and 65 maf (about 21 trillion gallons) in drought years. California's water demand in 2020 is forecasted to reach 81 maf (about 26 trillion gallons) in average years and 66 maf (about 22 trillion gallons) in drought years. The gap between water supply and water demand is projected to total 2.4 maf statewide during normal years and up to 6.2 maf in drought years by 2020. Water management options that are likely to be implemented would reduce these shortages to 0.2 maf in normal years and 2.7 maf in drought years. Not all areas of California are expected to experience shortages.

The State Water Resources Control Board (SWRCB) and the nine regional water quality control boards (RWQCBs) are responsible for protecting surface and groundwater supplies in

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[2] One acre foot (AF) is equivalent to 325,800 gallons.

California, regulating waste disposal, and requiring cleanup of hazardous conditions (California Water Code §§13000-13999.16). In particular, the SWRCB establishes water-related policies and approves water quality control plans, which are implemented and enforced by the RWQCBs. These agencies also regulate discharges to state waters through federal National Pollution Discharge Elimination System (NPDES) permits. Discharges to publicly owned treatment works (POTWs) are regulated through federal pre-treatment requirements enforced by the POTWs. There are 630 POTWs within California with a total permitted capacity of approximately 3.7 billion gallons per day.

c. Public Services

Public services offered throughout California include fire protection, police protection, schools, parks, and other public facilities.

City and county fire departments generally provide fire protection services with some cities contracting with the counties for services. The U.S. Forest Service provides fire protection on all national forest lands while the California Department of Forestry has jurisdiction over wildland fire protection in various unincorporated areas of California. County departments of forestry serve some areas. Over 60,000 personnel are employed in fire protection throughout California.

d. Transportation/Circulation

The agencies that share authority for transportation related programs in California include Caltrans, regional transportation planning agencies (RTPAs), and local governments. RTPAs develop long-range regional transportation plans (RTPs) and Transportation Improvement Programs (TIPs), which detail all of the capital and noncapital improvements to the transportation system that are planned and for which funds have been identified. RTPs also include descriptions of the various transportation and transit systems.

The federal Clean Air Act requires both RTPs and TIPs to ensure that on-road motor vehicle emissions are within State Implementation Plan limits. The California Clean Air Act requires urbanized areas in nonattainment districts to reduce the rate of travel growth.

e. Solid Waste/Hazardous Waste

Solid wastes consist of residential wastes (trash and garbage produced by households), construction wastes, commercial and industrial wastes, home appliances and abandoned vehicles, and sludge residues (waste remaining at the end of the sewage treatment process). A total of 188 Class III (non-hazardous) active landfills are located throughout California with a total permitted disposal capacity of 220,565 tons per day. Solidified paints may also be disposed of in such landfills.

Hazardous materials are substances with certain physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. A hazardous waste is any hazardous material that is discarded, abandoned, or to be recycled. In California, leftover liquid latex or oil-based paint is considered a hazardous waste and must be managed appropriately. Currently, there are three Class I landfills located in California, with estimated remaining disposal capacities of five, seven, and 20 years. Hazardous waste can also be shipped out of California for treatment and disposal.

f. Hazards

Potential hazards impacts may be associated with the production, use, storage, and transport of hazardous materials. Hazardous materials may be found at industrial production and processing facilities. Examples of hazardous materials used by consumers include petroleum, solvents, and coatings. Currently, hazardous materials are transported throughout California in great quantities via all modes of transportation including rail, highway, water, air and pipeline.

Hazards concerns are related to the risks of explosions, the release of hazardous substances, or exposure to air toxics. State law requires detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of to prevent or mitigate injury to health or the environment in the event that such materials are accidentally released. Federal laws, such as the Emergency Planning and Community-Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act or SARA) impose similar requirements.

This section in Chapter III also describes the reporting system for reporting accidental releases of hazardous materials. Data are provided for the number of hazardous materials releases in 1998, statewide. In addition, data are provided for releases of materials used to formulate architectural coatings.

Chapter III also briefly describes the existing setting for human health as it is affected by emissions from existing coatings formulations. As noted in this section, the actual effects of exposure to coatings depend on such factors as the exposure duration, potency of the solvents of concern, exposure frequency, and other factors. A table is included that shows the solvents currently used to formulate architectural coatings that are considered to be toxic substances. The table also shows the range of adverse human health effects for each toxic substance.

4. Summary of Chapter IV - Environmental Impacts and Mitigation Measures

CEQA Guidelines §15126(a) require the following: “An EIR shall identify and focus on the significant environmental effects of the proposed project. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects.”

The following subsections briefly summarize the analysis of environmental impacts that were identified in the NOP/IS as potentially resulting from implementation of the SCM.

a. Air Quality

Air quality impacts are considered significant if the proposal would conflict with or obstruct implementation of the applicable air quality plan; violate any air quality standard or contribute to an existing or projected air quality violation; expose sensitive receptors to substantial pollutant concentrations; expose off-site receptors to significant concentrations of hazardous air pollutants; result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment; diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutants; or create objectionable odors affecting a substantial number of people.

The adoption and implementation of the SCM on a statewide basis (excluding the South Coast Air Quality Management District or SCAQMD) is expected to produce substantial, long-term, VOC emission reductions. The analysis concludes that no significant adverse air quality impacts will result from the proposed SCM. Implementation of the proposed VOC content limits in the SCM will result in VOC emission reductions of approximately ~~11~~ 10 tons per day statewide (excluding the ~~South Coast~~ SCAQMD) beginning in 2003, a net air quality benefit.

Some companies in the architectural coatings industry have claimed that lowering the VOC content of coatings results in increased VOC emissions for a variety of reasons: increased coating thickness, more thinning, more topcoats, more touch-ups, more priming, more frequent recoating, more ~~substituted~~ substitution with higher VOC coatings, and greater reactivity. Basically, these companies claim that new formulations result in more coating use, resulting in an overall increase in VOC emissions for a specific area covered, or over time. Industry also asserts that more reactive solvents will be used in compliant ~~re~~formulations than those used in existing coatings, thus contributing to increased ozone formation. All eight areas were analyzed in depth in Chapter IV. The analysis reveals that overall, the SCM will achieve significant VOC emission reductions and the claimed adverse impacts will not occur.

Another claim made by some companies is that increased application of acetone-based coatings has the potential to increase objectionable odors. However, acetone used as a replacement for other traditional solvents may have fewer odor impacts because it has a higher odor threshold than many other solvents currently used in coatings. Given that the SCM allows sufficient time for manufacturers to develop compliant coatings and solve any odor problems associated with reformulated coatings, no significant adverse odor impacts are expected from lowering the VOC content limits.

No significant impacts are anticipated, therefore, no mitigation measures are necessary. Cumulative impacts are also considered not significant.

b. Water

Impacts on water resources are divided into two categories—water demand and water quality. Water impacts are considered significant if they cause changes in the course of water movements or of drainage or surface runoff patterns that would result in erosion or flooding; exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; substantially degrade water quality; deplete groundwater supplies, or interfere with groundwater recharge efforts; violate any water quality standards or waste discharge requirements, or exceed wastewater treatment requirements of the applicable RWQCB; require the construction of new, or expansion of existing, water, wastewater, or stormwater drainage facilities, the construction of which could cause significant environmental effects; require new or expanded water entitlements and resources; or exceed a wastewater treatment provider's existing commitments.

i. Water Demand

Increased water demand from the manufacturing and use of compliant water-borne coatings is evaluated in Chapter IV. The analysis concludes that water demand impacts associated with the SCM will be insignificant. The analysis reveals that while there is insufficient capacity in some hydrologic regions of California to meet current and projected water demand, the increased water demand associated with implementation of the SCM is *de minimis*. Furthermore, the various water providers throughout California are currently exploring various strategies for increasing water supplies and maximizing the use of existing supplies. Options include storage of water from existing sources, use or storage of water unused by other states or agricultural agencies, and advance delivery of water to irrigation districts.

No significant impacts are anticipated, therefore, no mitigation measures are necessary. Cumulative impacts are also considered not significant.

ii. Water Quality

The SCM is also not expected to adversely impact water quality. First, use of exempt solvents (solvents not considered to be VOCs, such as acetone and Oxsol 100) is expected to result in equivalent or fewer water quality impacts than currently used solvents (such as toluene, xylenes, mineral spirits, and methyl ethyl ketone), since the exempt solvents are less toxic. Second, because currently available compliant coatings are already ~~based on~~ using water-borne technology, no additional water quality impacts from future compliant water-borne coatings are expected~~ because these coatings are also expected to be water based~~. The current manufacturing and cleanup practices associated with water-borne coatings are not expected to change as a result of the SCM. Lastly, the SCM is not expected to promote the use of compliant coatings formulated with hazardous solvents that could create water quality impacts.

No significant impacts are anticipated, therefore, no mitigation measures are necessary. Cumulative impacts are also considered not significant.

c. Public Services

Public services impacts are considered significant if they will result in adverse physical impacts associated with the provision of new or altered public facilities in order to maintain acceptable service ratios or response times for fire protection, police protection, schools, parks, or other public facilities.

i. Public Facility Maintenance

Although not required by CEQA, ARB staff has examined the potential for increased maintenance at public facilities due to implementing the SCM. Infrastructure needs at public facilities are not expected to be impacted due to more frequent touchups to maintain facility appearance, equipment, or safety. Implementation of the SCM is also not expected to result in the need for new or altered public facilities.

ii. Fire Protection

The increased use of exempt solvents or other replacement solvents as a result of implementing the SCM will not result in any significant increased need for fire protection. Although acetone, which is flammable, is expected to be used to reformulate a limited number of coatings (*e.g.*, lacquers~~, floor coatings, and waterproofing sealers~~), it is unlikely that implementation of the SCM will substantially increase the future use of acetone throughout California. Many conventional solvents are as flammable as acetone, so there would be no net change or possibly a reduction in the hazard~~s~~ consequences from replacing some conventional solvents with acetone. Furthermore, future compliant coatings materials are expected to be less hazardous than some currently used materials, so accidental releases would be expected to pose a lower risk to responding firefighters.

No significant impacts are anticipated, therefore, no mitigation measures are necessary. Cumulative impacts are also considered not significant.

d. Transportation/Circulation

Transportation/circulation impacts are considered significant if they cause a substantial increase in traffic related to the existing traffic load and street capacity; exceed a level of service standard for designated roads or highways; substantially increase hazards due to a design feature or incompatible uses; result in inadequate emergency access, parking capacity, or hazards or barriers for pedestrians or bicyclists; or conflict with adopted alternative transportation policies, plans, or programs.

The potential additional vehicle trips caused by the disposal of coatings due to the possibility of shorter shelf or pot lives or lesser freeze-thaw capabilities~~, as compared to conventional coatings,~~ are evaluated in Chapter IV. The analysis concludes that transportation/circulation impacts associated with the SCM will be insignificant. Therefore, no mitigation measures are necessary. Cumulative impacts are also considered not significant.

e. Solid Waste/Hazardous Waste

Solid waste/hazardous waste impacts are considered significant if the proposal would not be served by a landfill with sufficient permitted capacity to accommodate the project's solid and/or hazardous waste disposal needs, or would not comply with federal, state, and local statutes and regulations related to solid and hazardous wastes.

The solid waste/hazardous waste analysis examined increased disposal of compliant coatings due to the possibility of shorter shelf or pot lives or lesser freeze-thaw capabilities~~ as compared to conventional coatings~~. The analysis concluded that solid waste/hazardous waste impacts associated with the SCM will be insignificant. Therefore, no mitigation measures are necessary. Cumulative impacts are also considered not significant.

f. Hazards

Hazards impacts are considered significant if they create a significant hazard to the public or the environment through the transport, use, disposal, or other handling of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials; result in the handling of hazardous materials or wastes within 1/4 mile of an existing or proposed school; are located on a site included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5; impair implementation of an adopted emergency response or evacuation plan; or increase fire hazard in areas with flammable materials.

i. Risk of Upset

Any increase in accidental releases of future compliant coatings materials would be expected to result in a concurrent reduction in the number of accidental releases of existing coatings materials. Further, it is anticipated that resin manufacturers and coatings formulators will continue the trend of using less hazardous solvents such as Texanol, Oxsol 100, and propylene glycol in their compliant~~, water-borne~~ coatings. It is expected that future compliant coatings will contain less hazardous ~~or nonhazardous~~ materials, or nonhazardous materials, as compared to conventional coatings, resulting in a net benefit. Therefore, hazards impacts associated with the proposed SCM will be insignificant and no mitigation measures are necessary. Cumulative impacts are also considered not significant.

ii. Human Health

The human health impacts analysis examined the potential increased long-term (carcinogenic and chronic) and short-term (acute) human health impacts associated with the use of various replacement solvents in compliant coatings formulations. The analysis concluded that the general public would not be exposed to long-term health risks due to the application of compliant coatings. Furthermore, long-term exposures of professional coatings applicators to more toxic replacement solvents such as diisocyanates are reduced by following the coatings manufacturers', Occupational Safety and Health Administration's (OSHA), and American Conference of Governmental Industrial Hygienists' (ACGIH) required and recommended safety procedures. Additionally, many resin manufacturers and coatings formulators are replacing more toxic solvents such as monomeric diisocyanates, EGBE, etc., with less toxic solvents such as polymeric diisocyanates, Texanol, and propylene glycol, further reducing the long-term human health risks from the use of compliant coatings.

Staff also evaluated the use of low- or zero-VOC, two-component, industrial maintenance (IM) systems containing diisocyanate compounds. Based on actual field monitoring data, and the chemistry of the two-component systems, staff has determined their use would not expose the public at large to significant acute human health impacts. Test data show that the concentrations of diisocyanate compounds emitted during the application of these IM systems are below established health protective thresholds. For acute exposure to applicators, the use of the same safety procedures to reduce long-term health effects will also reduce short-term health effects associated with the use of replacement solvents. Although toluene diisocyanate (TDI), which is classified as a carcinogen, could be used in low-VOC, two-component IM coatings, adverse impacts are not expected because application of IM coatings occurs primarily in industrial settings where sufficient safety equipment and procedures are in place to prevent significant exposures. Also, the application of these coating systems will be for maintenance (touch-up and repair) or repaint purposes, lasting only a few days to weeks, and occurring on an intermittent basis (once every two years to every 10 years or more). Based on these intermittent exposures, increased cancer risks are negligible. Furthermore, the coatings industry is moving away from using TDI to using noncarcinogens such as hexamethylene diisocyanate (HDI) and methylene bisphenyl diisocyanate (MDI) to formulate low-VOC, two-component coatings.

Lastly, staff evaluated the potential for exposure to crystalline silica as a result of increased sandblasting of surfaces prior to application of low-VOC coatings. Implementation of the SCM is not anticipated to result in the need for increased sandblasting or other surface preparation techniques. Moreover, State law restricts outdoor abrasive blasting throughout California. Under title 17, CCR, abrasive blasting may not be performed outdoors unless specified techniques and/or materials are used. Those techniques and materials minimize the emission of fine particulate matter from blasting operations, and thus minimize public exposure to inhalable particles.

Therefore, the general public as well as coatings applicators will not be exposed to significant long-term or short-term human health risks as a result of implementation of the SCM. Because no adverse impacts were identified, no mitigation measures are necessary. Cumulative impacts are also considered not significant.

g. Mitigation

Table I-1 summarizes the impacts and mitigation measures associated with the environmental impact areas that the ARB analyzed for the SCM.

h. Environmental Impacts Found Not to be Significant

The Initial Study for the SCM includes an environmental checklist of 15 environmental categories. As discussed above, review of the proposed project at the NOP/IS stage identified six areas for further review in the ~~Draft~~ Final Program EIR. For the remaining nine environmental areas where the Initial Study concluded that the project would have no significant direct or indirect adverse effects, no comments were received on the NOP/IS or at the public meetings that changed this conclusion. Consistent with CEQA, ARB staff has reaffirmed that there will be no significant impacts to the following environmental resources in California as a result of implementing the SCM:

- Land Use and Planning
- Population and Housing
- Geophysical
- Biological Resources
- Energy and Mineral Resources
- Noise
- Aesthetics
- Cultural Resources
- Recreation

TABLE I-1
ENVIRONMENTAL IMPACTS FROM IMPLEMENTATION OF THE SCM

Environmental Impact Area	Significance Determination	Mitigation Measures
Air Quality	Not Significant	None Required
Water		
Water Demand	Not Significant	None Required
Water Quality	Not Significant	None Required
Public Services		
Public Facility Maintenance	Not Significant	None Required
Fire Protection	Not Significant	None Required
Transportation/Circulation	Not Significant	None Required
Solid Waste/Hazardous Waste	Not Significant	None Required
Hazards		
Risk of Upset	Not Significant	None Required
Human Health	Not Significant	None Required

i. Other CEQA Topics

CEQA requires Program EIRs to address the potential for irreversible environmental changes, or growth-inducing impacts~~, and inconsistencies with regional plans~~. Consistent with CEQA, additional analysis of the proposed project confirms that it would not result in irreversible environmental changes or the irretrievable commitment of resources, or foster economic or population growth or the construction of ~~additional~~ new housing~~, or be inconsistent with regional plans~~.

j. Consistency

CEQA requires that the Program EIR address any inconsistency between the proposed project and applicable general plans and regional plans. Consistent with CEQA, analysis of the proposed project confirms that the project is consistent with State Implementation Plans, California Clean Air Act plans, and other regional plans.

5. Summary of Chapter V – Project Alternatives

Chapter V provides a discussion of alternatives to the proposed project even though such an analysis is not required since this ~~Draft~~ Final Program EIR finds no significant impacts. The alternatives analyzed include measures for attaining the objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative.

The NOP/IS prepared for the SCM included seven concepts that could possibly be further developed into project alternatives. These concepts included a low vapor pressure exemption, performance-based standards, reactivity-based standards, product line averaging, regional regulation, seasonal regulation, and modification of the VOC content limits/final compliance deadlines. In addition, ARB staff evaluated exceedance fees in response to a comment received on the NOP/IS. In addition to the alternatives specifically discussed in Chapter V, ARB staff also considered other alternatives during the development of the SCM. These alternatives consist of the many variations in the language of the SCM that were considered during the development of the SCM, as different versions of the SCM were distributed to the public, and modifications to the SCM's language that were made in response to comments received from industry and the air districts. The current version of the proposed SCM incorporates many of these suggested changes.

Alternatives the staff rejected as infeasible include the low vapor pressure exemption, performance-based standards, reactivity-based standards, regional regulation, seasonal regulation, and exceedance fees. Alternatives the staff considered to be feasible include the No Project Alternative, the Extended Compliance Deadlines Alternative, the Further Reduction of VOC Content Limits Alternative, and the Product Line Averaging Alternative. The rationale for the staff's conclusions is presented in Chapter V.

II.

PROJECT DESCRIPTION

A. PROJECT LOCATION

The SCM is designed as a model rule to be adopted by the local districts throughout the State of California. There are 35 individual districts in California. (The geographical boundaries of each district are shown in Figure II-1.) If a district decides to adopt the SCM in the future, the district's version of the SCM would apply to affected persons within the geographical boundaries of that district. The districts were created by the California Legislature as the public agencies responsible for developing and enforcing air pollution control regulations for pollution sources under their jurisdiction. By statute, districts are required to adopt or amend and enforce rules that will reduce air pollutant emissions in order to attain and maintain federal and State ambient air quality standards.

B. ARCHITECTURAL COATINGS DESCRIPTION

Architectural coatings, as defined in the SCM, are coatings that are applied to stationary structures~~ and their appurtenances at the site of installation~~, to portable buildings ~~at the site of installation~~, to pavements,~~ or ~~to curbs, or to any accessories to stationary structures. To be classified as an architectural coating, a coating must be applied in the field, at the site of installation, rather than in a shop or factory where pollution control equipment may be installed. Encompassed in the architectural coatings category are coatings applied to homes, schools, factories and processing plants, ~~and~~ public utilities, and structures. The ~~“appurtenances”~~ accessories included in the definition range from pipes to downspouts.

Coatings are used primarily for beautification and protection. Architectural coatings are designed specifically to be applied to a variety of surfaces, including metal, wood, plastic, concrete, bricks, and plaster. Some coatings are designed to be used ~~as topcoats~~ on the surface, while others are ~~intended~~ meant to be ~~applied to~~ used on the substrate with other coatings adhering to them. Some coatings are designed to impregnate the surface, while others are transparent and allow the substrate to be visible. Some of the specialty coatings in the architectural coatings category are formulated to withstand traffic, ~~heat~~ electrical energy, chemicals, caustics, and abrasion. Architectural coatings are applied by a variety of methods including, brush, roller, spray gun, or specialized equipment. Architectural coatings must also meet the application and performance expectations of do-it-yourselfers, professional painting contractors, and maintenance personnel.

Architectural coatings are formulated using four main categories of ingredients:

- Resins (polymers or binders) that bind the pigments and additives together and form a film upon drying. Sometimes copolymers are used to modify the properties of the

FIGURE II-1


California Air Districts and Counties
Air Districts are Delineated by Bold Black Text Labels and Grey Boundary Lines.
Counties are Delineated by Smaller Text Labels and Black Boundary Lines.
N
W
E
S
North Coast Unified
DEL NORTE
HUMBOLDT
TRINITY
Siskiyou
SISKIYOU
Modoc
MODOC
Shasta
SHASTA
Lassen
LASSEN
Tehama
TEHAMA
PLUMAS
Northern Sierra
SIERRA
NEVADA
Mendocino
MENDOCINO
Glenn
GLENN
Butte
BUTTE
YUBA
Colusa
COLUSA
Feather River
SUTTER
Lake
LAKE
Placer
PLACER
Yolo Solano
YOLO
El Dorado
EL DORADO
ALPINE
Northern Sonoma
SONOMA
NAPA
SOLANO
SACRAMENTO
Amador
AMADOR
Calaveras
CALAVERAS
Tuolumne
TUOLUMNE
Sacramento Metro
MARIN
CONTRA COSTA
SAN JOAQUIN
MONO
SAN FRANCISCO
ALAMEDA
STANISLAUS
Mariposa
MARIPOSA
Bay Area
SAN MATEO
SANTA CLARA
MERCED
SANTA CRUZ
MADERA
Great Basin Unified
Monterey Bay Unified
SAN BENITO
San Joaquin Valley Unified
FRESNO
INYO
TULARE
MONTEREY
KINGS
San Luis Obispo
SAN LUIS OBISPO
KERN
Kern
Mojave Desert
SAN BERNARDINO
SANTA BARBARA
Antelope Valley
Santa Barbara
VENTURA
LOS ANGELES
Ventura
ORANGE
RIVERSIDE
South Coast
Imperial
IMPERIAL
SAN DIEGO
San Diego
0
50
100
150
200 Miles
California Environmental Protection Agency
Air Resources Board
SCampbell/TSD_398

primary resin. Some resins used in architectural coatings include alkyds, latex, oils, vinyls, acrylics, cellulosics, epoxies, urethanes, and polyurethanes.

- Pigments, finely ground powders dispersed in the paint, provide its color, ability to hide the underlying surface, and other properties.

- Solvents are the volatile carriers used to control the viscosity of the paint and provide application properties. Some solvents used are water, alcohols, glycols, glycol ethers, ketones, esters, and aromatic or aliphatic hydrocarbons.

- Additives, or specialty chemicals, which assist in manufacture and application, may improve the properties of the finished film. Some examples of additives include preservatives, wetting agents, coalescing agents, freeze-thaw stabilizers, anti-foam agents, and thickeners.

In addition, extenders such as limestone, clay, gypsum, talc, and silica are sometimes added for performance characteristics or to control cost, but extenders generally are detrimental to application, gloss, and overall durability of coatings. Therefore, the highest performing paints consist of a balanced formulation of pigments and binders. They are available in a wide range of colors, gloss, and performance characteristics.

One important criterion for selecting coatings is durability. Exterior paints must be able to stand up to sunlight, humidity, water, heat, cold, ice, snow, and air pollution. ~~Important characteristics of i~~Interior paints are chosen for their color, gloss, and ability to withstand scrubbing.

Architectural coatings are usually purchased ready-to-use, although some come in two ~~or more~~ components that must be mixed prior to application. Coatings are sometimes thinned when they are too thick to spray or brush, or when low temperature or high humidity hamper application properties. Waterborne coatings are thinned with water only, whereas solvent-based coatings can only be thinned with organic solvents. ~~Similarly, brushes, rollers, and spray guns used with waterborne coatings are cleaned with water, while equipment used with solvent-based coatings is cleaned with organic solvents. However, s~~Solvents ~~may~~ are also ~~be~~ used with waterborne coatings following soap and water cleanup of ~~in the final step to clean~~ spray guns ~~that have been used to apply waterborne coatings~~ to prevent deterioration of the equipment.

C. ARCHITECTURAL COATINGS RULES

1. District Rules

The ARB does not have jurisdiction over the control of emissions from architectural coatings. VOC emissions from architectural coatings operations are currently regulated by a number of local district rules. Under these rules, emissions are controlled by limiting the VOC content, measured in grams per liter, of the architectural coatings sold and applied in the district. A table of the current district rules, including the applicable VOC limits, is included in Appendix B of the NOP/IS (Appendix B of this ~~Draft~~ Final Program EIR). Most of these current district rules, as well as the proposed SCM, apply to those persons who supply, sell, apply, solicit the application of, or manufacture such coatings.

Some of the limits in these existing rules were based on the ARB's 1989 SCM for architectural coatings. A consortium of California air pollution control districts, the ARB, U.S. Environmental Protection Agency (U.S. EPA) Region IX, and coatings manufacturers developed the provisions in the 1989 SCM.

2. National Architectural Coatings Rule

Section 183(e) of the federal Clean Air Act requires the U.S. EPA to develop a national architectural coatings rule. On August 14, 1998, U.S. EPA promulgated the final version of its national rule for architectural coatings. The national rule took effect on September 13, 1999.

The national rule applies only to manufacturers and importers of architectural coatings, while the SCM applies to manufacturers, distributors, and users of architectural coatings. The national rule also contains over 20 categories that are not included in the SCM or district rules. In addition, the national rule definitions for many categories differ from those in the SCM.

~~In all but two categories, roof coatings and traffic coatings, the national rule has the same or higher (less restrictive) VOC limits than the SCM and most districts' rules (states or local governments are allowed to adopt more stringent emission standards). Because both the national rule and the district rule are in force in a district that has adopted an architectural coatings rule, the ARB has tried to harmonize the provisions of the national rule and the proposed SCM.~~

For the most part, California districts will not see additional emission reductions from the national rule, since the majority of the national limits are equal to or higher than the districts' limits. Many nonattainment districts still need additional emission reductions from architectural coatings and other emissions categories to improve air quality. Therefore, it is important that the proposed SCM be adopted, and that districts continue to amend their rules based on the SCM.

D. ARCHITECTURAL COATINGS EMISSION INVENTORY

1. Emission Inventory

Architectural coatings are the largest segment of the total paint market in the U.S. In 1996, shipments of architectural coatings accounted for just over one-half of the total industry shipments. Architectural coatings are sold to do-it-yourself (DIY) consumers, painting contractors, and commercial and industrial maintenance users through company stores, independent dealers, mass retailers, and home improvement centers.

Emissions from architectural coatings in California are estimated to be about 130 tons per day, on an annual average, of VOCs. This represents about nine percent of the total stationary source emissions, and about four percent of all VOC emissions statewide.[1] This 130 tons per day

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[1] This percentage may change in the future due to the impact of the latest motor vehicle emissions estimates (EMFAC 2000).

is more than all the VOC emissions from petroleum refining and marketing combined, and is comparable in size to the VOC emissions from the emission categories of pesticides, degreasing operations, and all other coatings.

The 1998 ARB survey data (see below), based on reported 1996 sales, indicate total statewide architectural coatings sales of approximately 87 million gallons, resulting in over 72 million pounds of VOC emissions, or slightly more than 0.8 pounds of VOC emissions per gallon of coating (ARB, 1999b). Waterborne coatings account for roughly 82 percent of the market.

2. Emission Inventory Issues

a. Emission Inventory versus Ambient Monitoring Data

The Environmental, Legislative, and Regulatory Advocacy Program of the California Paint and Coatings Industry Alliance (EL RAP, 1998) states that emission inventories estimate the amount of VOC emissions from architectural coatings at two to four percent of total atmospheric VOC. EL RAP contends that this differs from ambient monitoring data, which show substantially lower concentrations. EL RAP states that this raises uncertainties regarding the extent to which architectural coating VOC emissions contribute to ozone formation, and under what conditions. However, our review of the data does not support the supposed differences, as discussed further below.

For example, EL RAP claims that the South Coast Air Quality Management District's (SCAQMD) emission inventory shows that in the South Coast Air Basin (SoCAB), architectural coatings contribute about two to four percent of the total VOC emissions (including biogenic VOCs). But they say a recent monitoring and source apportionment study found that the VOCs attributable to architectural coatings was only 0.2 percent on average, or about 1/20th the amount predicted in the SCAQMD emission inventory. EL RAP suggests the discrepancy may be due to underestimation of the emissions from other sources in the inventory, but also to overestimation of architectural coatings emissions. We do not believe there is such a discrepancy.

In ARB's published 1996 emission inventory, architectural coatings are estimated to contribute statewide 130 tons per day of reactive organic gases (ROG), out of a total of 3200 tons per day of ROG from all sources, and 1470 tons per day of ROG for stationary sources and area sources. Thus, emissions of architectural coatings contribute about nine percent of stationary/ area sources and four percent of total emissions statewide. The 1996 inventory data for architectural coatings are based on the 1990 ARB architectural coatings survey. Updates are in progress based on the 1998 ARB survey data and indicate similar proportions.

Source apportionment studies are used to evaluate and improve emission inventories, which are in turn used in modeling for ozone. In these studies, representative source profiles are obtained from the major emission sources in the inventory including vehicular emissions (exhaust, evaporated fuel, and liquid fuel), architectural and industrial solvents, and petrochemical production and oil refining. Biogenic emissions are important to include in source apportionment studies in the eastern part of the U.S. where there are abundant forests, but biogenics are a smaller source of emissions in the western part of the country where conditions are more arid. Profiles of VOCs from representatives of these source types are used to translate the ROG emission inventory to the speciated inventory. Continuous VOC monitors such as Photochemical Assessment Monitoring (PAMS) stations are used to collect the ambient data that the model apportions to the respective sources (Watson *et al.*, undated).

The source apportionment study cited to us by the commenter was that of Fujita *et al*. (1997). The speciated data for architectural coatings was from earlier work by Fujita. The authors reported that surface coatings were a major contributor to ambient non-methane hydrocarbons (NMHC) in the SoCAB. Surface coatings contributed three to five percent to the ambient NMHC in the SoCAB.~~ in three ARB monitoring sites, and five to seven percent for eight Coordinating Research Council (CRC, the sponsor of the study) sites.~~

The work of Fujita *et al.* is also reported by Watson *et al.* (undated). ~~This source specifies that architectural coatings contributed an average of 3.2 to 5.0 percent (three ARB sites) or 0.3 to 1.1 percent (eight CRC sites) to the NMHC in Los Angeles. Industrial coatings contributed 1.7 to 9.3 percent (ARB sites) or 4.1 to 6.9 percent (CRC sites), while other coatings contributed 1.7 to 10 percent or 1.1 to 8.9 percent, respectively.~~ Although this source apparently misquotes the results of the original study, it does show that ~~However,~~ the coating profiles used as VOC source profiles, as percent of NMHC mass, were from Censullo *et al.* (1996), and represented quick dry primers, sealers, and undercoaters and graphic arts coatings, both of which are solvent-borne. These two categories represented only 1.4 percent and 2.5 percent, respectively, of the ARB's 1998 architectural coatings survey (ARB, 1999b). Thus, the large contribution of water-based coatings was not represented, and thus the study underestimated the contribution of architectural coatings to the ambient inventory.

Fujita (1999) stated that the Fujita *et al*. monitoring and source apportionment studies quoted by EL RAP were primarily designed to measure motor vehicle emissions, and not to focus on architectural coatings, so the results should not be considered to be representative of coatings in the Los Angeles area. Further, the architectural coating speciation profiles reflected only solvent-based coatings, not water-based coatings. Also, the sampling and analysis methods would not have measured the high molecular weight, polar, hydrophilic hydrocarbons that are common in water-based paints, but would instead have identified only the hydrocarbons more commonly contained in solvent-based coatings. Thus, the architectural coatings contribution in the source apportionment study reflects only the contributions of solvent-based coatings, not water-based coatings.

~~ARB concludes that because waterborne coatings make up roughly 80 percent of the inventory (ARB, 1999b), and assuming the solvent-borne coatings made up an average of one percent of the inventory in the source apportionment study, the real percentage of the architectural coatings inventory in the source apportionment can be estimated to be four percent. This is the same number as the ARB reports in its emission inventory.~~

The ambient monitoring techniques in the source apportionment studies have been designed primarily to measure hydrocarbons emitted by motor vehicles. Insofar as some of these hydrocarbons are also emitted from the evaporation of solvent-based architectural coatings, it would be difficult to separate the coatings' contribution from that of the vehicles. In addition, since the monitoring techniques have not been designed to measure many of the VOCs used in water-based coatings, such as glycol ethers, we do not believe that ambient monitoring data supports the statement that architectural coatings contribute substantially lower concentrations than the estimated two to four percent contribution of VOCs to current emission inventories.

The source apportionment study is discussed further in the response to Comment #15-9 in Appendix I of the Final Program EIR.

As mentioned previously, routine ambient air quality monitoring sites measure ozone, not VOC and NO_x. The PAMS monitors or special studies such as the Southern California Ozone Study (ARB, 1997) or the Central California Ozone Study (ARB, 1999a) are needed to better understand the emissions of precursors. These special studies are very expensive and are run infrequently, but the results are used to improve emission inventories.

b. Biogenic Emissions

In its concept paper, EL RAP (1998) attributes 60 percent of the atmospheric VOCs to be from natural sources (trees and vegetation) and 40 percent from man-made sources (motor vehicle exhaust, gasoline evaporation, and solvent use). However, for California, ARB believes this is a misleading comparison. As discussed below, in the South Coast Air Basin (SoCAB), anthropogenic VOC emissions are greater than 90 percent. In general, biogenic contributions to peak ozone readings in urban areas (where ozone violations occur) are in the five to 15 percent range.

In response to particular stimuli, trees such as oaks, aspens, cottonwoods, eucalyptus, pines, firs, magnolia, cypress, and spruce emit specific hydrocarbons such as isoprene, mono- and sesqui-terpenes, methyl butenol, and other semi-volatile and oxygenated compounds. The emissions are connected to the life cycle of the trees, seasonal factors, photosynthetic active radiation, and ecological factors such as drought or sudden rains. The range of biogenic emissions from these plants varies by a large factor because plants respond to daily stimuli for growth and development, and therefore these processes are difficult to estimate. Another key issue is that biogenic emissions occur mostly in rural communities, away from urban centers where the ozone formation process is most intense.

Before the late 1980s, scientists believed that biogenic hydrocarbons contributed little or nothing to the accumulation of ozone precursors in either rural or urban environments. However, two papers in the late 1980’s began to change that view, and since then interest and research on biogenic emissions has increased (Chameides and Cowling, 1995).

The role of biogenics emerged in the National Research Council’s (NRC) 1991 report, *Rethinking the Ozone Problem in Urban and Regional Air Pollution* (Seinfeld *et al.*, 1991). In that report, the NRC reported that biogenic VOCs and anthropogenic NO_x can significantly affect ozone formation in urban and rural parts of the U.S., and recommended that in the future, biogenic VOCs be more adequately assessed to provide a baseline against which the effectiveness of ozone control strategies can be compared.

Since the early 1980s, the ARB has sponsored research to measure emission rates for native plant species, agricultural crops, and ornamental plants grown in California. Inventories of biogenic emissions have been developed for the major air basins in California by combining emission rates with surveys of species-specific biomass densities (ARB, 1993).

Biogenic emissions in California are primarily in the areas of dense vegetation such as the alpine areas of San Diego, Los Angeles, Kern, and Ventura Counties. These areas are elevated and downwind of the major urban centers in the South Coast, San Diego, and Central Coast air basins. Sustained mixing from high above the air basins down to the urban centers is required for biogenic emissions to play a significant role in ozone production. Fortuitous meteorological patterns would be required for this mixing to occur, and even under these conditions biogenic emissions are too diffuse to contribute significantly to ozone production (Lashgari, 1999).

Results of air quality modeling by the ARB in the 1987 Southern California Air Quality Study show that biogenic emissions have minimal effect in the urban areas of the Los Angeles basin where the peak ozone concentrations occur. These results reflect the fact that over 90 percent of the VOC emissions in the area are anthropogenic and that most of the biogenic emissions are emitted in unpopulated areas downwind of the urban areas. Overall, biogenic VOCs appear to play a small role in ozone formation in the urban portions of the air basin. However, as further progress is made to reduce anthropogenic VOC emissions, biogenic VOC emissions will increase in relative importance in urban areas (ARB, 1993).

A study by Arey *et al.* (1995) showed that the sum of the estimated isoprene and monoterpene emissions in the South Coast Air Basin is 130-190 tons per day, compared to the estimated 1600 tons per day of anthropogenic VOCs in the 1987 emission inventory for the South Coast Air Basin (SoCAB). It has been estimated that the hydrocarbon emissions need to be reduced to 180 tons per day for the SoCAB to meet the NAAQS for ozone; thus it appears that biogenic emissions alone could cause ozone exceedances, although the spatial distribution of the biogenic emissions make this unlikely.

A study by Benjamin *et al.* (1997) showed that the combined isoprene and monoterpene emissions were estimated to be 125-140 tons per day for an average summer day in the SoCAB. (Isoprenes are VOCs typically emitted from deciduous trees, while monoterpenes are emitted by conifers). On a mass basis, the biogenic VOC emissions inventory of the SoCAB represents about 10 percent of the anthropogenic emissions. However, since the majority of the biogenic emissions occur in the mountains on the northern and eastern boundaries of the SoCAB, downwind of the most heavily populated areas, the actual impact of these emissions on air quality is probably less than suggested by the mass of the inventory. The monitoring and source apportionment study discussed above (Fujita *et al.*, 1997) found that biogenic emissions were an insignificant contributor to the speciated non-methane hydrocarbons in the SoCAB.

California has a state-of-the-art biogenic hydrocarbon simulation program built upon an advanced research program. The Biogenic Emission Inventories through Geographic Information Systems (BEIGIS) has recently simulated data for the 1997 Southern California Ozone Study. The results of the 1997 Southern California Ozone Study are still being analyzed. A biogenic emission inventory for all of California is in the early stages of development. The Central California Ozone Study (CCOS) will contribute input databases and validation to an all-California BEIGIS simulation. Photochemical modeling improvements are also needed to account for methyl butenol, an important issue for ozone simulations in rural alpine locations. However, full understanding of the role of biogenic emissions in highly vegetated areas of California and their role in attaining the NAAQS are dependent on further developments. The ARB sponsored a biogenic symposium on December 9-10, 1999, to discuss the latest research in this area, particularly in California.

E. DEVELOPMENT OF THE SCM

1. 1998 Architectural Coatings Survey

In late 1997, ARB staff began working with manufacturers and industry groups to develop a new survey of architectural and industrial maintenance coatings sold in California. The last such ARB survey was undertaken in 1993 and surveyed sales and VOC contents of coatings sold in 1990. In February 1998, the ARB sent out the latest survey seeking 1996 sales data. Unlike previous surveys, this survey asked for information on the speciation of VOCs in an effort to identify what VOCs and non-VOC solvents are being used in architectural coatings, and to allow for an evaluation of the reactivity of the emissions. The final report was issued in September 1999.

Table II-1 shows a summary comparison between the 1993 and 1998 surveys (using 1990 and 1996 sales data, respectively). These data show that architectural coatings in California are continuing to shift toward waterborne, low-VOC coatings. In 1990, almost 75 percent of the paints sold were waterborne, while in 1996, waterborne paints made up over 80 percent of the total. In addition, the data also indicate that, on average, architectural coatings in 1996 had lower VOC contents than in 1990. Both of these trends seem to indicate that emissions from architectural coatings should be declining, assuming that the growth in population and housing do not cancel out any trend in reductions.

TABLE II-1
1990/1996 SURVEY COMPARISON

	1990	**1996**
Total volume, gallons	77.1 million	87.5 million
Waterborne/solvent-borne split, %	76/24	82/18
Estimated annual average emissions (tons per day)	126	117
Gallons per capita	2.6	2.7
Emissions per capita (pounds)	3.1	2.6

According to the 1998 ARB survey, architectural coatings are currently available that comply with the proposed VOC limits for coatings categories affected by the proposed SCM (Table II-2). These data indicate that low-VOC architectural coatings are already available and being used for many applications.

2. Durability and Performance Studies

a. Harlan Associates Study

In February 1995 the ARB published the results of performance testing of architectural coatings by Harlan Associates, Inc. The purpose of the study was to determine the physical properties and performance of representative products in eight coating categories. A total of 110 coating products, purchased during late 1993 and throughout 1994, were tested in the following categories:

- Industrial Maintenance Primers and Topcoats
- High Temperature Industrial Maintenance Coatings
- Lacquers
- Varnishes
- Nonflats (including Quick-Dry Enamels)
- Primer/Sealers (including Quick-Dry Primer/Sealers)
- Sanding Sealers
- Waterproofing Sealers (Wood and Concrete)

While the raw data from this study were published in 1995, an analysis of the overall comparison of the coatings' test performance was not published. In developing the proposed SCM, ARB and district staffs analyzed and summarized the raw data. This performance study, although somewhat dated, is used to supplement the newer National Technical Systems (NTS) study.

b. NTS Study

In support of the 1999 amendments to its architectural coatings rule (Rule 1113), the SCAQMD contracted with NTS to test performance characteristics of six significant architectural coating categories. The ARB staff has participated on the contract's technical advisory committee, which was established to oversee contractor selection, coating selection, testing protocol development, and results analysis. The study was initiated in May 1998, and an interim report was released in April 1999. In addition to the laboratory results, accelerated actual exposure, real time actual exposure, and actual application characteristics studies are continuing. The results of the study are an important part of our technical evaluation of these eight coating categories (see Chapter VI and Appendix ~~D, Description and Technical Assessment of the Coating Categories~~ E of the Staff Report).

The purpose of the NTS study was to test the application and durability performance of very low-VOC, low-VOC, and just-compliant coatings for the following six coating categories:

- Industrial Maintenance Coatings
- Nonflat Coatings
- Primers, Sealers, and Undercoaters
- Quick-Dry Enamels

- Quick-Dry Primers, Sealers, and Undercoaters

- Waterproofing Sealers

TABLE II-2
SUMMARY OF CURRENTLY AVAILABLE COMPLIANT COATINGS

Coating Category	**Number of Products in ARB Survey**	**SWA VOC Content (g/l)[1] Solvent-Based**	**SWA VOC Content (g/l)[1] Water-Based**	**Complies with Proposed Limit**	
				# of Coatings	**% of Total Sales Volume[~~1~~2]**
Flat Coatings	2,355	373	98	1,097	48.5
Nonflat Coatings					
Low Gloss	851	341	133	472	75.7
Medium Gloss	2,139	287	151	805	57.3
High Gloss	796	366	209	~~46~~ 333	~~2.6~~ 79.5
Antenna Coatings	NR	NR	NR	NR	~100[3]
Antifouling Coatings	PD[2]	351	n/a	PD	100
Bituminous ~~Roof~~ Coatings	151	225	3	~~101~~ 110	~~97.6~~ 98
Bituminous Roof Primers	NS	NS	NS	NS	Unknown[4]
Bond Breakers	PD	750	345	PD	PD
Clear Wood Coatings					
Clear Brushing Lacquers	NS	NS	NS	NS	Unknown[4]
Lacquers	~~299~~ 403	~~665~~ 647	~~220~~ 181	~~87~~ 138	~~8.5~~ 13.8
Sanding Sealers	31	665	281	5	4.5
Varnishes	~~431~~	~~462~~	~~270~~	~~174~~	~~48.4~~
Clear	341	463	260	146	47.6
Semitransparent	90	459	296	28	51.5
Concrete Curing Compounds	47	677	180	36	95.1
Dry Fog Coatings	51	367	182	46	96.6
Faux Finishing Coatings	NS	NS	NS	NS	~100[3]
Fire-Resistive Coatings	NS	NS	NS	NS	Unknown[4]
Fire-Retardant Coatings					
Clear	PD	n/a	22	PD	100
Opaque	57	267	46	53	99.8
Floor Coatings	578	197	164	~~128~~ 373	~~34.9~~ 84.8
Flow Coatings	NR	NR	NR	NR	~100[3]
Form Release Compounds	13	247	2	PD	PD
Graphic Arts Coatings	108	628	10	18	81.2
High Temperature Coatings	~~93~~ 204	367	222	54	52~~.5~~

Coating Category	Number of Products in ARB Survey	SWA VOC Content (g/l)[1] Solvent-Based	SWA VOC Content (g/l)[1] Water-Based	Complies with Proposed Limit	
				# of Coatings	% of Total Sales Volume[~~1~~2]
Industrial Maintenance Coatings	2,759	321	170	941	28.0
Low Solids Coatings					
Stains	PD	n/a	77	PD	100
Wood Preservatives	PD	n/a	42	PD	100
Magnesite Cement Coatings	5	590	0	PD	PD
Mastic Texture Coatings	56	223	79	56	100
Metallic Pigmented Coatings	125	456	137	98	98.3
Multi-Color Coatings	22	520	268	13	65.8
Pre-Treatment Wash Primers	30	716	248	PD	PD
Primers, Sealers, and Undercoaters (PSUs)	~~765~~ 891	~~358~~ 360	~~106~~ 105	~~404~~ 445	73~~.6~~
Quick-dry Enamels[~~3~~5]	154	403	n/a	PD	PD
Quick-Dry PSUs[~~4~~6]	150	432	136	19	34.6
Recycled Coatings	NS	NS	NS	NS	~100[3]
Roof Coatings	174	259	13	125	97~~.4~~
Rust Preventative Coatings[~~5~~7]	25	382	144	16	63.5
Shellacs					
Clear	PD	614	n/a	PD	100
Opaque	PD	534	n/a	PD	100
Specialty PSU	NS	NS	NS	NS	Unknown[4]
Stains	1,323	440	163	337	52.8
Swimming Pool – General	18	438	147	PD	PD
Swimming Pool – Repair	6	569	n/a	0	0
Temperature-Indicator Safety Coatings	NS	NS	NS	NS	High[3]
Traffic Marking Coatings	161	290	124	107	53.4
Waterproofing Sealers	~~175~~	~~358~~	~~307~~	~~95~~	~~13.0~~
Concrete/Masonry[8]	175	358	307	138	95.2
Wood[8]	175	358	307	95	12.8
Wood Preservatives					
Below Ground	3	352	350	PD	PD
Clear	20	~~142~~ 141	102	16	94.7
Semitransparent	25	390	218	20	74.1
Opaque	PD	658	132	PD	PD

1. Unless otherwise noted, units are grams of VOC per liter of coating, less water and exempt solvents.
~~1~~2. Based on sales volumes reported in the 1998 Architectural Coatings Survey.
~~2. PD = Protected Data. Less than three companies reporting.~~
3. Complying marketshare estimated (not based on ARB survey).
4. Complying marketshare unknown, but estimated to be significant because many district rules currently have the same VOC limit specified in the SCM.
~~3~~5. A number of nonflat coatings not included in this category also meet the definition of quick-dry enamel.
~~4~~6. A number of PSU coatings not included in this category also meet the definition of quick-dry PSU coating.
~~5~~7. These include products specifically listed as rust preventative in the ARB study. Other coatings that may be considered rust preventative coatings are included under other categories.
8. Waterproofing sealers were surveyed in the ARB's 1998 Architectural Coatings Survey, but the survey did not distinguish between products for wood and concrete. The complying marketshares are based on all waterproofing sealers.
PD = Protected data. Less than three companies reporting.
NR = None reported in survey.
NS = Not surveyed.
Source: ARB's 1998 Architectural Coatings Survey, except where noted.

Results from the NTS study show that when compared to conventional, currently compliant coatings, low-VOC coatings available today have similar application and performance characteristics, including blocking resistance, mar resistance, adhesion, abrasion resistance, and corrosion protection.

Since the initiation of the NTS study, staff has received and reviewed detailed information pertaining to numerous compliant coatings for each category included in this proposal. Staff compared technical data provided for each coating in each category by the manufacturer to assess coverage, dry times, durability (adhesion, abrasion resistance, chemical resistance, impact resistance, scrubability, etc.), solids content by volume, and other characteristics. Some manufacturers have also forwarded actual laboratory test data and third party testing.

3. Meetings with District and U.S. EPA Representatives

In February 1998, staff began meeting with representatives of districts that will use the SCM as the basis for their district architectural coating rule. The U.S. EPA has also been involved to provide insight in harmonization with the national rule. The purpose of these meetings was to discuss:

(1) district needs and emission reductions needed from architectural coatings;
(2) findings of the 1998 architectural coatings survey;
(3) existing research and suggest future research needs;
(4) possible revisions to the 1989 SCM;
(5) scope and content of an environmental assessment that can be applied statewide; and
(6) opportunities for flexibility in how manufacturers can comply with coatings regulations.

Staff held ~~12~~ 20 meetings and conference calls with the districts between February 1998 and ~~January~~ May 2000.

4. Public Meetings and Meetings with Manufacturers

In developing the proposed SCM, ARB held ~~seven~~ eight public meetings attended by representatives from industry (resin manufacturers, coatings formulators, and coatings contractors), local districts, the U.S. EPA, and other interested parties. These public meetings were held on May 27 and August 20, 1998, and on March 30, June 3, July 1, September 8, ~~and~~ December 14, 1999, and March 16, 2000. The July 1, 1999, meeting was a Scoping Meeting held to solicit input on the Draft Program EIR.

In addition to the above-mentioned public meetings, manufacturers held individual meetings with ARB staff. Over ~~20~~ 45 individual meetings were held with manufacturers.

F. PROJECT OBJECTIVE AND DESCRIPTION

The proposed project is essentially a model rule designed to be considered for adoption by the local air pollution control and air quality management districts in California. The primary objective of the SCM is to set VOC limits and other requirements that are feasible (based on existing and currently developing coatings technology) and that will achieve significant reductions in VOC emissions from architectural coatings. The SCM is also intended to improve the clarity and enforceability of existing district architectural coatings rules and provide a basis for uniformity among architectural coatings rules in California. The proposed SCM sets allowable VOC content limits for a number of architectural coatings categories, including categories such as flats, nonflats, industrial maintenance, lacquers, floor, roof, rust preventative, stains, and primers, sealers, and undercoaters. The proposed VOC limits for most categories would become effective on January 1, 2003 (January 1, 2004, for industrial maintenance coatings).

Other components of the proposed SCM include a three-year “sell-through” provision (for coatings manufactured before the applicable effective dates), a petition provision to allow limited use of higher VOC industrial maintenance coatings in the San Francisco Bay Area, North Central Coast and North Coast Air Basins, definitions, test methods, standards for painting practices and thinning of coatings, container labeling requirements, and reporting requirements. ARB staff is currently working with all interested parties to develop an averaging provision for inclusion in the SCM proposed to the Board at the June 22, 2000, Board meeting. This provision will be patterned after the SCAQMD averaging provision in Rule 1113, but will include a sunset date. It is necessary to include a sunset date in the SCM’s averaging provision to ensure that districts meet their SIP commitments, because the proposed VOC limits are less stringent than the final limits in SCAQMD’s Rule 1113.

Implementation of the proposed SCM is estimated to result in approximately ~~11~~ 10 tons per day of VOC emission reductions statewide, excluding the SCAQMD. (The SCAQMD’s recently revised Rule 1113 – Architectural Coatings is already in place)~~, and 0.15 tons per day additional emission reductions from the interim limits are anticipated from implementation of the~~

~~proposed SCM.)~~. Table II-3 summarizes the proposed VOC limits and the associated projected emission reductions.

TABLE II-3
PROPOSED SCM VOC LIMITS AND ASSOCIATED ESTIMATED EMISSION REDUCTIONS

Category	VOC Limits (grams/liter)[1]	VOC Reductions in the State (excluding the SCAQMD[2]) (tons/day)
Flat Coatings	100	1.39
Nonflat Coatings	150	~~1.50~~ 1.17
Nonflat – High Gloss	250	0
Antenna Coatings[4]	530	0
Antifouling Coatings	400	0
Bituminous Roof Coatings	~~250~~ 300	~~0.01~~ 0
Bituminous Roof Primers	350	0
Bond Breakers	350	0
Clear Wood Coatings		
Clear Brushing Lacquers	680	0
Lacquers	550	~~1.04~~ 1.03
Sanding Sealers	350	0
Varnishes	350	0
Concrete Curing Compounds	350	0
Dry Fog Coatings	400	0
Faux Finishing Coatings	350	0
Fire-Resistive Coatings	350	0
Fire-Retardant Coatings		
Clear	650	0
Opaque	350	0
Floor Coatings	~~100~~ 250	~~0.38~~ 0
Flow Coatings	420	0
Form-Release Compounds	250	0
Graphic Arts Coatings (Sign Paints)	500	0
High Temperature Coatings	420	0
Industrial Maintenance Coatings	250	~~2.98~~ 2.95
Low Solids Coatings	120[3]	0
Magnesite Cement Coatings	450	0
Mastic Texture Coatings	300	0
Metallic Pigmented Coatings	500	0
Multi-Color Coatings	250	0.01
Pre-Treatment Wash Primers	420	0
Primers, Sealers, and Undercoaters	200	~~0.77~~ 0.64

TABLE II-3 (CONTINUED)

PROPOSED SCM VOC LIMITS AND ASSOCIATED ESTIMATED EMISSION REDUCTIONS

Quick-Dry Enamels	250	0.99
Quick-Dry Primers, Sealers, & Undercoaters	200	1.00
Recycled Coatings	250	0
Roof Coatings[4]	250	0
Rust Preventative Coatings[4]	400	0
Shellacs		
Clear	730	0
Opaque	550	0
Specialty Primers, Sealers and Undercoaters	350	0
Stains	250	0.64
Swimming Pool Coatings	340	~~0.03~~ 0
Swimming Pool Repair and Maintenance Coatings	340	0.03
Temperature-Indicator Safety Coatings	550	0
Traffic Marking Coatings[4]	150	0
Waterproofing Sealers -Wood	250	~~0.56~~ 0.39
Waterproofing Sealers - Concrete	400	0
Wood Preservatives	350	0
TOTAL		**~~11.30~~ 10.3**

1 Unless otherwise noted, units are grams of VOC per liter of coating, less water and exempt solvents.

2 SCAQMD limits are already in place~~; the SCM will achieve additional reductions of 0.15 tons per day in the SCAQMD (from the interim limits)~~.

3 Units are grams of VOC per liter of coating, including water and exempt compounds.

4 Identical to the national rule limit. Accordingly, no additional reductions will occur from the proposed SCM limits. However, the national limit will result in emission reductions outside the SCAQMD. See Appendix D for details.

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III.

EXISTING SETTING

A. INTRODUCTION

To determine the significance of the impacts associated with a proposed project, CEQA requires that a project's impacts be evaluated against the backdrop of the environment as it exists at the time the NOP is published. The CEQA Guidelines defines "environment" as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance" (CEQA Guidelines §15360; see also Public Resources Code §21060.5). An EIR must also include a description of the physical environment in the vicinity of the project as it exists at the time the NOP is published, from both a local and regional perspective (CEQA Guidelines §15125). Therefore, the "environment" or "existing setting" against which a project's impacts are compared consists of the immediate, contemporaneous physical conditions at and around the project site (Remy *et al*., 1996). The NOP/IS for the architectural coatings SCM identified six environmental topic areas that could potentially be adversely affected by implementation of architectural coatings rules based on the SCM—air quality, water, public services, transportation/circulation, solid waste/hazardous waste, and hazards. This chapter includes a discussion of the physical and regulatory setting for each of the six areas.

B. AIR QUALITY

1. Ambient Air Quality and the Need for Emission Reductions

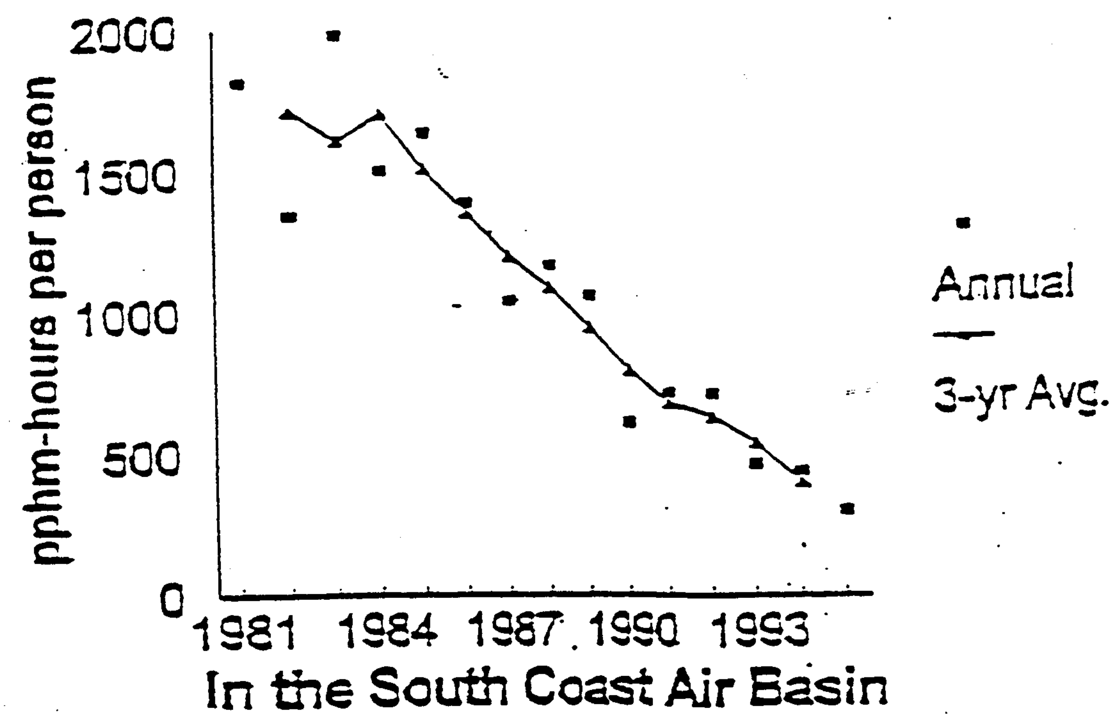
~~Ozone~~

VOC emissions contribute to the formation of both ozone and PM_{10} (particulate matter less than 10 microns equivalent aerodynamic diameter). Ozone formation in the lower atmosphere results from a series of chemical reactions between VOCs and nitrogen oxides in the presence of sunlight. PM_{10} is the result of both direct and indirect emissions. Direct sources of PM_{10} include emissions from fuel combustion and wind erosion of soil. Indirect PM_{10} emissions result from the chemical reaction of VOCs, nitrogen oxides, sulfur oxides and other chemicals in the atmosphere.

Ozone

VOCs and nitrogen oxides (NO_x) react in the presence of sunlight to form ozone. The rate of ozone generation is related closely to the rate of VOC production (in the form of reactive organic gases, or ROG) as well as the availability of NO_x in the atmosphere (U.S. EPA, 1996; Seinfeld and Pandis, 1998). At low ambient concentrations, ozone is a colorless, odorless gas, and the chief component of urban smog. It is ~~by far California's most~~ one of the State's more persistent ~~and widespread~~ air quality problems. Air quality data have revealed that 75 percent of the nation's exposure to ozone occurs in California (ARB, 1994a). As shown in Figure III-1, the population-weighted average exposure to ozone concentrations above the State ambient air quality standard of nine parts per hundred million (pphm) in the South Coast Air Basin has been declining. However, despite this decline and nearly 25 years of regulatory efforts, ozone continues to be an important environmental and health concern.

Figure III-1
Population-Weighted Exposure to Ozone Concentrations
Above the State Ambient Air Quality Standard



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It has been well documented that ozone adversely affects the respiratory functions of humans and animals. Human health studies show that short-term exposure to even very low levels of ozone injures the lung (ARB, 1997; U.S. EPA, 1996). Ozone is a strong irritant that can cause constriction of the airways, forcing the respiratory system to work harder in order to provide oxygen to the body. Besides shortness of breath, it can aggravate or worsen existing respiratory diseases such as emphysema, bronchitis, and asthma (U.S. EPA, 1996).

Chronic exposure to ozone may cause permanent damage in deep portions of the lung. In some animal studies, permanent structural changes due to long-term ozone exposure were noted. These changes remained even after periods of exposure to clean air (U.S. EPA, 1996). The ARB is currently conducting a study to determine the effects of ozone on lung development. The "Epidemiologic Investigation to Identify Chronic Health Effects of Ambient Air Pollutants in Southern California" is a long-term study which is documenting the lung development of children in 12 cities in California. The air quality in these 12 communities varies from good to moderate and poor, so any trends in lung development may be determined. Preliminary results of this on-going study do indicate that chronic ozone exposure slows lung development although no conclusions specific to ozone have been drawn.

Not only does ozone adversely affect human and animal health, but it also affects vegetation throughout most of California resulting in reduced yield and quality in agricultural crops and disfiguration or unsatisfactory growth in ornamental vegetation. During the summer, ozone levels are often highest in the urban centers in Southern California, the San Joaquin Valley, and Sacramento Valley, which are adjacent to the principal production areas in California's multibillion-dollar agricultural industry. ARB studies indicate that ozone pollution damage to crops is estimated to cost agriculture over 300 million dollars annually (ARB, 1987a). Similarly, the U.S. EPA estimates national agricultural losses to exceed 1 billion dollars annually (U.S. EPA, 1996).

PM_{10}

Airborne particulate matter (PM_{10}) is a solid or liquid substance with less than (<) 10 microns determined as the equivalent aerodynamic diameter. PM_{10} can be directly emitted into the atmosphere as the result of anthropogenic actions such as fuel combustion or natural causes such as wind erosion. Indirect PM_{10} is formed via a complex reaction involving a gas-to-particulate matter conversion process in which VOCs can participate (Seinfeld and Pandis, 1998). The focus of this discussion will be on the indirect aerosol formation of $PM_{10.}$

PM_{10} is composed of up to 35 percent aerosols which may be the result of atmospheric chemical reactions of sulfate, nitrates, ammonium, trace metals, carbonaceous material (VOCs), and water. The products of the gas-phase reactions may combine to form new particles (either single or two or more vapor phase species) or increase existing particle growth by condensation of VOCs (Seinfeld and Pandis, 1998). Furthermore, although the contribution from VOCs is not known, carbonaceous aerosols generally account for a significant fraction of the fine (<2 micron equivalent aerodynamic diameter) urban particulate matter. In Los Angeles, for example, aerosol carbon alone accounts for about 40 percent of the total fine particulate mass (Seinfeld, 1989).

PM_{10}, and specifically, its smaller fraction, $PM_{2.5}$, are inhaled deep into the lungs, causing significant adverse health effects. The particulate matter irritates the respiratory tract, and may contain toxic as well as carcinogenic compounds (Godish, 1991). Epidemiologic evidence indicate that certain populations are particularly sensitive to PM_{10}, including the elderly, persons suffering from lung or cardiopulmonary disease, infants and children, and asthma sufferers.

These populations suffer a range of health effects. Among children, decrements in lung function occur, leading to increased school absences, and asthmatic individuals may suffer from increased respiratory symptoms. Among the elderly and in individuals suffering from cardiopulmonary disease, excacerbations of chronic disease leading to increased hospital admissions are seen (U.S. EPA, 1997). ~~Because it is visible in the atmosphere,~~ PM$_{10}$ also contributes to reduced visibility.

To protect California's population from the harmful effects of ozone and PM$_{10}$, federal and State air quality standards for these contaminants have been established. These standards are shown in Table III-1. The State hourly ozone standard is nine pphm and the national hourly ozone standard is 12 pphm. The State PM$_{10}$ standard for a 24-hour period is 50 micrograms per cubic meter (µg/m^3), and the national standard is 150 µg/m^3 over a 24-hour period.

TABLE III-1
AMBIENT AIR QUALITY STANDARDS FOR OZONE AND PM$_{10}$

Pollutant	Averaging Time	State Standard	National Standard
Ozone	1 hour	9 pphm (180 g/m^3)	12 pphm (235 g/m^3)
PM$_{10}$	Annual Geometric Mean	30 g/m^3	--------
	24 hour	50 g/m^3	150 g/m^3
	Annual Arithmetic Mean	-------	50 g/m^3

In 1997, the U.S. EPA promulgated a new national eight-hour ozone standard, and new national standards for particulate matter (PM$_{10}$ and PM $_{2.5}$). On May 14, 1999, the U.S. Court of Appeals for the District of Columbia put implementation of the new standards on hold. The Court ruled that the agency had overstepped its constitutional authority in setting the new standards because, among other things, it did not clearly articulate the rationale used in selecting specific levels for the standards. The Court remanded all of the standards to the U.S. EPA for further consideration. During remand, the status of the standards is as follows: (1) the Court vacated the new PM$_{10}$ standard, (2) the Court left the new eight-hour ozone standard in place, but held that the standard "cannot be enforced," and (3) the Court will decide in the future whether the PM $_{2.5}$ standard should be vacated outright, or remain in place while the case is remanded to the U.S. EPA. The U.S. EPA appealed the court's decision to the full U.S. Court of Appeals; however, a narrowly divided Court let stand the decision. U.S. EPA ~~now intends to~~ asked the Supreme Court to review the decision and the court has agreed to do so.

The court decision has no immediate impact on California's air quality programs, because most of California continues to violate the pre-existing national and State one-hour ozone and PM$_{10}$ standards, and the court decision did not affect the applicability of these standards. The pre-existing national one-hour ozone and PM$_{10}$ standards continue to apply. Also, California's State standards continue to apply. (In general terms, California's one-hour ozone standard is similar in its impact to the new federal eight-hour standard.) Regardless of the ultimate legal fate of the new federal standards, ARB and the districts will need to pursue new emission reduction measures to attain the existing standards. Given this situation, as well as the unsettled legal status of the new national standards, this Program EIR will not further discuss the new standards.

The vast majority of California's population who live in urban areas breathe unhealthy air for much of the year, as clearly shown in Figure III-2 (ARB, 1998). Lastly, Figures III-3 and III-4 show that unhealthy levels of ozone and PM_{10}, respectively, are not limited to just urban areas, but can be found in nearly every county in California. As shown in these maps, 46 counties are currently designated as nonattainment for the State ozone standard, while 5~~5~~4 counties are designated as nonattainment for the State PM_{10} standard (ARB, 1999). These counties contain over 97 and 99 percent, respectively, of California's population, a clear indication of the extent and magnitude of the ozone and PM_{10} problems in California.

2. Strategy for Attaining the National and State Ozone Standards

The California Clean Air Act requires districts that have been designated nonattainment for the State ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide to prepare and submit plans for attaining and maintaining the standards (see Health and Safety Code §40910 *et seq*.). In addition, the federal Clean Air Act requires that districts designated nonattainment for the federal ambient air quality standards prepare State Implementation Plans to demonstrate attainment with the federal standards. In some of these districts, substantial additional emission reductions will be necessary if attainment is to be achieved. In developing their plans, each district determines which measures are necessary to include, as well as the specific details of each included measure.

The plans from various districts underscore the increasing role of pollution from areawide sources, including consumer products and architectural coatings. As emissions from facilities and vehicles are reduced, the widespread areawide sources become a larger part of the inventory, and are included as a more significant area for potential reductions of VOC emissions. It is estimated that without additional architectural coatings regulations, the inventory for architectural coatings emissions will increase due to population growth~~. Implementation of the SCM would result in VOC emission reductions of approximately 12 tons per day statewide, excluding the SCAQMD, and would realize an additional 0.15 ton per day reduction in the SCAQMD (from the interim limits)~~.

Figure III-2
California Exceedences of
State Ambient Air Quality Standards During 1997

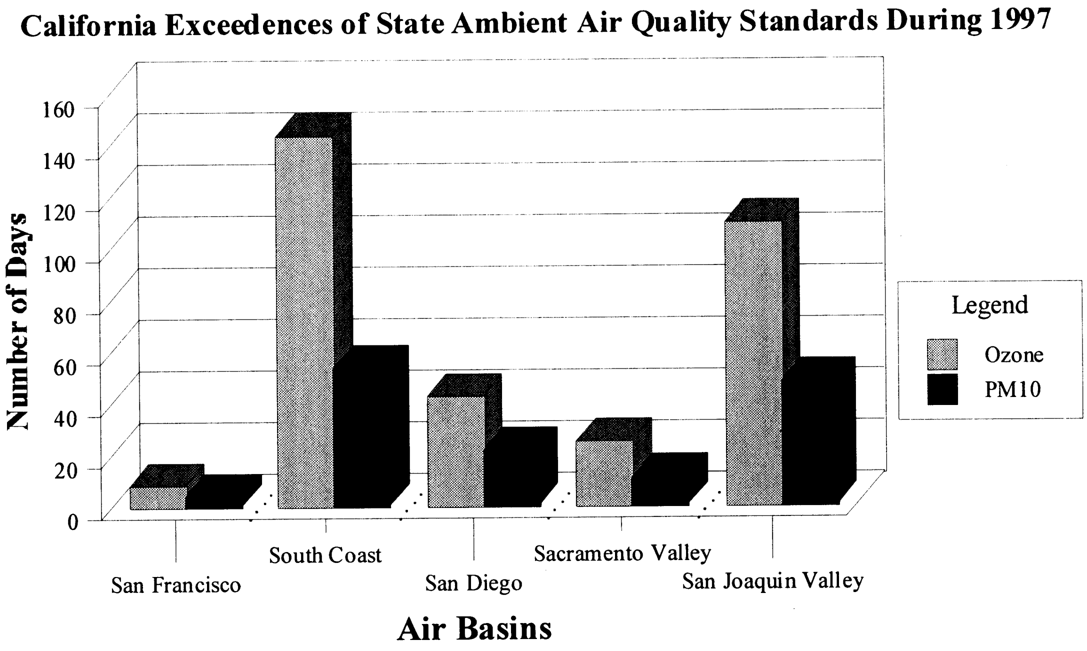

Figure III-3
Area Designations for State Ambient Air Quality Standard for Ozone

Figure III-4
Area Designations for State Ambient Air Quality Standard for PM_{10}

3. Climate[1]

California is approximately 800 miles in length and spreads over 10 degrees in latitude. Altitude ranges from 276 feet below sea level in Death Valley to 14,495 feet above sea level at the summit of Mt. Whitney. These wide ranges of altitude and latitude are responsible in part for the variety of climates found throughout California. Another significant factor is the continuous interaction of maritime air masses with those of continental origin. Along the western side of the Coast Range, the climate is dominated by the Pacific Ocean. Warm winters, cool summers, small daily and seasonal temperature ranges, and high relative humidities are characteristic. Areas more distant from the ocean experience a more continental climate with warmer summers, colder winters, greater daily and seasonal temperature ranges, and generally lower humidities.

Seasonal and daily temperatures are more uniform on the ocean side of the Coast Range and in coastal valleys. In San Diego, for example, the average monthly temperature in January is 55^o (all temperatures in this section are in degrees Fahrenheit), while the August reading is only 72^o. In Eureka, the January mean is 47^o and the August mean is 57^o. East of the Sierra Nevada temperature patterns are continental in character with wide variations. In Bishop, the January mean temperature is 39^o and the July mean is 77^o. Between the two mountain ranges and over much of the desert areas, the temperature regime is intermediate with hot summers and moderate to cold winters.

The average length of the growing season, as limited by occurrences of 32^o temperatures, ranges from 365 days along the southern coast to less than 50 days at high elevations of the Sierra Nevada. Most coastal valleys and the Central Valley have a freeze-free season of 225 to 300 days. In the southeastern deserts, the growing season is from 250 to 325 days long, but the season is limited to 100 to 125 days in the northeastern interior.

In general, relative humidities are moderate to high along the coast throughout the year. Inland humidities are high during the winter and low during summer. Where mountain barriers prevent the free flow of marine air inland, humidities decrease rapidly. The Mojave and Colorado Deserts experience very low humidities with the high temperatures of summer. Winter readings are generally moderate to low. The Sacramento and San Joaquin Valleys have characteristically low humidities except in the Delta area where a strong inflow of marine air during the summer creates a transition zone intermediate between the high humidities of the coast and the low readings of the interior.

Annual precipitation totals in excess of 50 inches are characteristic of the west slope of the Sierra Nevada north of Stockton, the west slope of the Coast Range from Monterey County northward (with the exception of the Monterey Bay and San Francisco Bay areas), and parts of the Cascades. In the lee of the Coast Range, yearly amounts drop off to 15 inches in parts of the Sacramento Valley and to less than eight inches over most of the San Joaquin Valley. The northeast interior portion of California receives from 15 to 18 inches of moisture per year.

In the mountains of southern California, annual rainfall totals reach 30 to 40 inches, while the coastal plain receives only 10 to 15 inches. The southeast desert receives as little as two to

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[1] Source: Elford, 1970.

five inches per year. The extreme range within California is represented by an annual total of less than two inches in Death Valley and by more than 100 inches in portions of the Coast Range near the Oregon border.

In Northern California, the months of heaviest precipitation are October through April. In Eureka, for example, 90 percent of the annual rainfall falls in this period. The rainy season becomes shorter in Southern California, with 83 percent of the rainfall occurring from November through March. In the north and over the central and northern mountains there are usually from 60 to 100 days of precipitation per year, while in the southern desert there may be as few as 10 days.

Snow has been reported in nearly every part of California, but it is very infrequent west of the Sierra Nevada except at high elevations of the Coast Range and Cascades.

Prevailing airflow over California is from the west or northwest much of the year. However, the mountain ranges deflect these winds and except for the immediate coast, wind direction is more influenced by local terrain than prevailing air circulation.

C. WATER

1. Water Supply

Water supplies are classified into three broad groups by the Department of Water Resources (DWR): surface water, groundwater, and recycled/desalted water (DWR, 1998). Surface water sources include developed supplies from the Central Valley Project (CVP), State Water Project (SWP), Colorado River, other federal projects, and local projects.

The CVP, built in the 1940s, is the largest water storage and transfer system in California. The CVP stores up to 12 million acre feet (maf) and delivers 7.3 maf annually to more than 250 long-term water contractors. The majority of CVP water goes to agricultural users, although a number of large urban centers in the Central Valley also receive CVP water.

About 20 million Californians get some portion of their water from the SWP, California’s major distribution system for urban water supplies. The 29 water agencies that buy SWP water have contracted for long-term deliveries of about four maf of water per year. Existing facilities, however, only allow the SWP to deliver about 2.4 maf in a normal water year and 1.1 maf in dry years.

The Colorado River provides water to seven states including California, with each state’s water use determined by the Colorado River Compact of 1922. Currently, California’s basic apportionment of Colorado River water is 4.4 maf. However, due to above-normal runoff in the Colorado River Basin, and the states of Arizona and Nevada not taking their full apportionment, California has received an average of 4.8 maf per year in recent years.

Groundwater includes developed subsurface supplies and water reapplied through deep percolation. California's groundwater reserves provide about 25-30 percent of California's usable water supply in normal years and up to two-thirds of the supply in critically dry years.

Water recycling is another important technology to make better use of existing water resources. More than half of California's recycled water is used for agricultural irrigation. About 20 percent is used for groundwater recharge and 16 percent is used for landscape irrigation. Recycled water is also increasingly being used by industry in cooling processes and for other purposes. DWR projects the amount of recycled water will increase from about 485,000 acre-feet in 1995 to over 1.4 maf by 2020.

The capacity of California's existing desalting plants totals about 66,000 acre-feet annually; feedwater sources are brackish groundwater, wastewater, and seawater. Total seawater desalting capacity is currently about 8,000 acre-feet per year statewide. Most existing plants are small (less than 1,000 acre-feet per year) and have been constructed in coastal communities with limited water supplies. The supply of desalted seawater is expected to remain constant at 8,000 acre-feet per year through 2020.

Local water districts are the primary water purveyors in California. These water districts receive some of their water supply from surface and groundwater resources within their respective jurisdictions, with any shortfall made up from supplemental water purveyors. In some cases, 100 percent of a local water district's water supply may come from supplemental sources. Several groundwater basins in California are threatened by overdraft conditions, increasing levels of salinity, and contamination by toxics or other pollutants. Local supplies may also be reduced by conversion of agricultural land to urban development, thereby reducing the land surface available for groundwater recharge. Increasing demand for groundwater may also be limited by water quality, since levels of salinity in sources currently used for irrigation could be unacceptably high for domestic use without treatment.

2. Water Demand

California is divided into 10 hydrologic regions, corresponding to California's major drainage basins. Table III-2 summarizes average and drought year water supply and demand by hydrologic region in 1995 and 2020, assuming as a worst-case scenario that there are no changes to existing facilities and programs.

DWR estimates that California's total water demand, based on the planning year 1995, is approximately 80 maf in average years and 65 maf in drought years. California's water demand in 2020 is forecasted to reach 81 maf in average years and 66 maf in drought years. California's increasing population is a driving force behind increasing water demands. California's population was more than 32 million in 1995 and is expected to increase by an additional 15.5 million by 2020. Even with water management options that are likely to be implemented, the gap between water supply and demand is projected to total 0.2 maf during normal years and up to 2.7 maf in drought years by 2020.

The largest urban water use is in the South Coast Region where roughly half of California's population resides. Several major conveyance systems bring water to the urbanized portion of the region from northern California via the SWP, the Sierra Nevada via the Los Angeles Aqueduct, and the Colorado River via the Colorado River Aqueduct. The All-American/ Coachella Canals deliver agricultural irrigation water from the Colorado River to the Coachella Valley. The continued availability of water from these sources is uncertain at current levels of development.

3. Water Quality

California has an extensive regulatory program to control water pollution. The most important statute governing water quality is the Porter-Cologne Act, which gives the State Water Resources Control Board (SWRCB) and the nine regional water quality control boards (RWQCB) broad powers to protect surface and groundwater supplies in California, regulate waste disposal, and require cleanup of hazardous conditions (California Water Code §§3000-13999.16). In particular, the SWRCB establishes water-related policies and approves water quality control plans, which are implemented and enforced by the RWQCBs. The nine regional boards include: North Coast, San Francisco Bay, Central Coast, Los Angeles, Central Valley, Lahontan, Colorado River Basin, Santa Ana, and San Diego.

It is the responsibility of each regional board to prepare water quality control plans to protect surface and groundwater supplies within its region. These plans must identify important regional water resources and their beneficial uses, such as domestic, navigational, agricultural, industrial, and recreational; establish water quality objectives, limits, or levels of water constituents or characteristics established for beneficial uses and to prevent nuisances; and present an implementation program necessary to achieve those water quality objectives. These plans also contain technical information for determining waste discharge requirements and taking enforcement actions. The plans are typically reviewed and updated every three years (California Water Code §13241).

California dischargers of waste that "could affect the quality of the waters of the State" are required to file a report of waste discharge with the appropriate regional water board (California Water Code §13260). The report is essentially a permit application and must contain information required by the regional board. After receipt of a discharge report, the regional board will issue "waste discharge requirements" analogous to a permit with conditions prescribing the allowable nature of the proposed discharge (California Water Code §§3263, 13377, and 13378).

TABLE III-2
PROJECTED WATER SUPPLY AND DEMAND BY HYDROLOGIC REGION (taf)*

Region	**1995**						**2020**					
	Average Year			Drought Year			Average Year			Drought Year		
	Supply	Demand	Shortage	Supply	Demand	Shortage	Supply	Demand	Shortage	Supply	Demand	Shortage
North Coast	20,607	20,607	0	10,491	10,668	177	20,672	20,672	0	10,546	10,722	176
San Francisco Bay	7,115	7,115	0	5,412	5,760	349	7,176	7,176	0	5,773	5,773	0
Central Coast	1,381	1,595	214	1,328	1,610	282	1,592	1,592	0	1,519	1,620	100
South Coast	5,224	5,224	0	4,775	5,283	508	5,994	5,993	0	6,090	6,090	0
Sacramento River	14,553	14,664	111	13,239	14,106	867	14,918	14,917	0	13,560	14,282	722
San Joaquin River	10,757	10,996	239	8,943	9,731	788	10,814	10,813	0	8,949	9,607	658
Tulare Lake	12,228	13,098	870	9,663	11,525	1,862	12,678	12,880	202	10,558	11,426	868
North Lahontan	942	942	0	752	880	128	950	960	10	773	901	128
South Lahontan	587	676	89	559	651	92	926	927	0	901	901	0
Colorado River	4,506	4,575	69	4,479	4,574	95	4,152	4,152	0	4,151	4,151	0
Total	**77,900**	**79,492**	**1,592**	**59,641**	**64,788**	**5,147**	**79,872**	**80,082**	**212**	**62,820**	**65,473**	**2,653**

* taf = thousand acre feet

a. National Pollution Discharge Elimination System Requirements

Most discharges into California's waters are regulated by the National Pollution Discharge Elimination System (NPDES), a regulatory program under the federal Clean Water Act. The NPDES is supervised by U.S. EPA, but administered by the SWRCB. NPDES requirements apply to discharges of pollutants into navigable waters from a point source, discharges of dredged or fill material into navigable waters, and the disposal of sewage sludge that could result in pollutants entering navigable waters. California has received U.S. EPA approval of its NPDES program. Pursuant to California's NPDES program, any waste discharger subject to the NPDES program must obtain an NPDES permit from the appropriate RWQCB. The permits typically include criteria and water quality objectives for a wide range of constituents. The NPDES program is self-monitoring, requiring periodic effluent sampling. Permit compliance is assessed monthly by the local RWQCB and any NPDES violations are then categorized and reported to U.S. EPA on a quarterly basis.

U.S. EPA has also published regulations that require certain industries, cities and counties to obtain NPDES permits for stormwater discharges [(55 CFR (1990)]. The new regulations set forth permit application requirements for classes of stormwater discharges specifically identified in the federal Clean Water Act. The regulated stormwater discharges include those associated with industrial activity and from municipal storm sewer systems serving a population of 100,000 or more.

b. Discharges to Publicly Owned Treatment Works (POTWs)

Water discharges to a public sewage system (referred to generically as a POTW), rather than directly to the environment, are not subject to the NPDES discharge requirements. Instead, such discharges are subject to federal pretreatment requirements under §§307(b) and (c) of the Clean Water Act [33 USC §1317(b)-(c)]. Although these pretreatment standards are enforced directly by U.S. EPA, they are implemented by local sanitation districts (Monahan *et al.*, 1993). The discharger, however, has the responsibility to ensure that the waste stream complies with the pretreatment requirements of the local system. Any facility using air pollution control equipment affecting water quality must receive a permit to operate from the local sanitation district. In cases where facilities modify their equipment or install air pollution controls that generate or alter existing wastewater streams, owner/operators must notify the local sanitation district and request that their existing permit be reviewed and modified.

To ensure compliance with wastewater pretreatment regulations, local sanitation districts sample and analyze the wastewater streams from facilities approximately two to four times per year. Persons who violate California's water quality laws are subject to a wide array of enforcement provisions. In 1990, U.S. EPA revised and extended existing regulations to further regulate hazardous waste dischargers and require effluent testing by POTWs. To comply with revised permit limits, POTWs may alter their operations or impose more stringent local limits on industrial user discharges of hazardous wastes (Monahan *et al*., 1993). POTWs in California are operated by sanitation districts that adopt ordinances establishing permit systems and fee structures. There are 630 POTWs in California.

D. PUBLIC SERVICES

Public services include fire protection, police protection, schools, parks, and other public services and facilities administered by local, regional, state, and federal government agencies.

1. Fire Protection

Fire protection consists of fire fighting, paramedical care, fire detection, and building and fire code inspection. In addition, fire protection agencies are usually the first to respond to an emergency release of hazardous materials. City and county fire departments generally provide these services with some cities contracting with the counties for services. The U.S. Forest Service provides fire protection on 23 million acres of national forest and other lands. The California Department of Forestry and Fire Protection (CDF) is directly responsible for wildland fire protection of over 31 million acres of California's privately owned watershed lands. In addition, the department provides full fire service protection to nearly 11 million acres under reimbursement agreements with local governments. The department cooperates with federal and local government fire fighting agencies and the Governor's Office of Emergency Services (OES).

As of 1994, over 43,000 personnel were employed by 522 local fire departments throughout California (State Fire Marshal, 1994). Response times vary according to many factors, such as size of area covered, distance from station, time of day, and road congestion. In the South Coast region, for example, average response times vary from four to 15 minutes for emergency medical service and from three to 15 minutes for structure incidence fires (SCAG, 1993). Response times are often longer in rural areas than in suburban and urban areas.

2. Police Protection

As of 1996, there were approximately 70,000 full-time law enforcement officers employed in California, yielding a ratio of 22 officers per 10,000 civilians (Reaves and Goldberg, 1998). Most cities in California maintain their own police departments, although some cities contract with county sheriff’s departments or nearby larger cities for police services. Unincorporated areas receive police protection from county sheriff’s departments. The California Highway Patrol (CHP) provides law enforcement services on State and interstate highways. The CHP also provides backup services, along with county sheriff’s departments, on federal lands such as national forests and Bureau of Land Management land. State rangers protect State parks and recreation areas.

3. Schools

There are 8,331 K-12 public schools in California with a total enrollment of 5,884,111 (approximately 28 percent of which is in Los Angeles County) (CBEDS, 1999). The capacity of school facilities to accommodate the student population is directly affected by increases in school enrollment. The process of constructing or modernizing a school building originates with and is the responsibility of the 1,055 individual school districts. The school district determines the type and size of the school building utilizing criteria set forth from the California Department of Education. The size is also determined by the number of students to be housed in the facility, and consideration of health and safety issues designated by the appropriate State agencies.

At the post secondary level, California has 106 community colleges with an enrollment of over 1,000,000; 28 California State University campuses with an enrollment of over 340,000; and nine University of California campuses with an enrollment of over 165,000.

4. Parks and Recreation Areas

Numerous parks and recreational areas are maintained at the city, county, and regional levels throughout California. The California Department of Parks and Recreation administers 263 units and properties within the California State Parks system. California's 18 national forests are administered by the U.S. Forest Service, while the National Park Service maintains 23 different units including nine national parks. Other federal agencies that manage recreation areas in California include the Bureau of Land Management, U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, and U.S. Fish and Wildlife Service.

5. Other Public Facilities

Other public facilities include libraries, museums, courts, prisons, airports, harbors, public roads, transportation systems, bridges, and water, wastewater, drainage, and solid waste disposal systems. These facilities are administered by various government agencies at different levels.

E. TRANSPORTATION/CIRCULATION

Many agencies share authority for transportation planning and operations in California. These agencies include regional transportation planning agencies (RTPAs), county transportation authorities, local government transportation departments, and Caltrans. For purposes of air quality planning, RTPAs and air districts generally share responsibility for developing transportation measures to achieve air quality objectives.

Federally designated metropolitan planning organizations (MPOs) are required to adopt and periodically update long-range transportation plans for their areas of jurisdiction [(title 23 USC §134(g)(1)]. RTPAs are also required, under §65080 of the Government Code, to prepare regional transportation plans (RTPs) for their areas. These subsections also specify that actions by transportation agencies must be consistent with an adopted RTP that conforms with air quality requirements in order to obtain federal and state funding. Under the federal Clean Air Act, RTPs must meet federal air quality conformity requirements. Failure to comply with conformity requirements will result in some loss of transportation funding.

The transportation system utilized in California is a multi-faceted and multi-modal system for moving people and goods. It includes an extensive network of freeways, highways and roads; public transit; air, rail and sea routes; and nonmotorized modes of travel (walking and biking). The routes of travel to move people and goods are briefly summarized below.

1. Freeways, Highways, and Arterials

There are over 170,000 miles of publicly maintained roads in California, almost 80 percent of which are city and county roads (Caltrans, 1998). The California State Highway System is made up of 15,158 miles of roadway; 2,292 miles (15 percent) are Interstate highway, and the remaining 12,866 miles are federal-aid highway. In 1998, the estimated vehicle miles traveled on California’s roads was 153 billion miles (Caltrans, 1997).

There are 218 transit operators in California providing transportation services using nine different modes of service to transport 1.1 billion passengers annually. The majority of ridership, 81 percent, is carried by nine transit operators located in the four major metropolitan areas of California—the San Francisco Bay Area, Sacramento, Los Angeles, and San Diego—with riderships of over 20 million annually.

Trucks carry roughly 600 million tons of goods moved within and through California. While truck transport occurs to some extent over the entire 170,000 miles of California's highways and roads, long-haul heavy truck travel is concentrated on California’s 7,513-mile portion of the National Highway System.

2. Rail

California is served by two major “Class I” railroads, the Burlington Northern Santa Fe and the Union Pacific. It is also served by some 27 short-line operations that serve as connectors to the major railroads, harbor areas, and intermodal terminals, and that provide service to agricultural and warehousing areas and the timber and resource industries.

Railroads carry about 100 million tons of goods annually. Most of this is interstate trade, since rail is generally only competitive with trucks on trip distances over 500 miles.

3. Maritime

There are 11 major publicly operated seaports and three privately operated seaport areas in California. California’s seaports handle about 130 million dry tons of cargo a year and about 200 million tons total. In 1993, the three major ports, Los Angeles, Long Beach, and Oakland, together handled approximately 70 percent of U.S. West Coast seaport trade by value.

4. Air

California's major air cargo facilities are located in Los Angeles, San Francisco, Oakland, and Ontario. Los Angeles International Airport is the third busiest cargo airport in the world, handling more than 1.5 million metric tons of cargo in 1994. San Francisco International Airport (SFO) is the eleventh busiest cargo airport in the U.S. and the nineteenth busiest in the world. In 1994, SFO handled over 687,000 metric tons of air cargo. Oakland International Airport is the third busiest airport for air cargo in California, handling over 497,000 metric tons in 1994. Ontario International Airport is the fourth busiest air cargo airport in California and second busiest in Southern California, handling over 345,000 metric tons.

F. SOLID WASTE/HAZARDOUS WASTE

1. Solid Waste

Solid waste consists of residential wastes (trash and garbage produced by households), construction wastes, commercial and industrial wastes, home appliances and abandoned vehicles, and sludge residues (waste remaining at the end of the sewage treatment process). CCR title 14, Division 7, provides the State standards for the management of facilities that handle and/or dispose of solid waste. CCR title 14, Division 7, is administered by the California Integrated Waste Management Board (CIWMB) and the designated Local Enforcement Agency (LEA). The designated LEA for each county is the County Department of Environmental Health.

CCR title 14, Division 7, establishes general standards to provide required levels of performance for facilities that handle and/or dispose of solid waste. Other requirements included in CCR, title 14, include operational plans, closure plans, and post-closure monitoring and maintenance plans. This regulation covers various solid waste facilities including but not limited to landfills, material recovery facilities (MRFs), transfer stations, and composting facilities.

A total of 188 active Class III landfills are located throughout California, with a total permitted capacity of 220,565 tons per day (CIWMB, 1999a). These facilities are currently permitted to accept municipal solid waste. Based on 1990 data, the CIWMB estimates that tin and steel cans make up 2.83 percent of a typical city’s residential waste stream. Empty metal paint cans are a subset of the tin and steel can category, which also includes canned food and beverage containers, empty spray paint and other aerosol containers, and bimetal containers with steel sides and aluminum ends.

In California, it is illegal to dispose of latex paint in the trash or down storm drains or sewer drains (CIWMB, 1999b). According to the California Department of Toxic Substances Control (DTSC), it is also illegal to air dry or mix small amounts of latex paint with any substance for the purpose of solidifying it and disposing of it because this practice is considered “treatment of a hazardous waste.” (See below for a discussion of hazardous waste management in California.) However, if latex paint has naturally dried out, it may be disposed of in the trash.

Although empty paint containers can be disposed of in the trash, many local solid waste or household hazardous waste collection programs collect the containers for recycling. A container is considered “empty” if no paint pours out when it is held upside down, any paint remaining in the container cannot be removed by chipping or scraping, and no propellant is dispensed when the pressure-sensitive valve is pressed down on an aerosol can.

California’s permitted disposal facilities accepted over 33 million tons of solid waste in 1998 (CIWMB, 1999c), almost one-third of which was accounted for by Los Angeles County. Most of California's solid waste is sent to 15 large landfills, which accept from 5,000 to 10,000 tons per day. On average, California’s landfills have space to continue accepting solid waste for at least 28 more years (CIWMB, 1999d). In addition, the planned Mesquite Regional Landfill in Imperial County has been permitted to accept approximately 600 million tons of waste, which will allow it to operate upwards of 100 years. Once the facility is operational, it will accept waste from Southern California communities via rail.

2. Hazardous Waste

Hazardous materials are substances with certain physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. As defined in CCR title 22, Division 4.5, Chapter 11, Article 3, hazardous materials are grouped into the following four categories based on their properties: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials) and reactive (causes explosions or generates toxic gases). A hazardous waste is any hazardous material that is discarded, abandoned, or to be recycled. The criteria that render a material hazardous also make a waste hazardous (Health and Safety Code, § 25151). If improperly handled, hazardous materials and wastes can result in public health hazards if released to the soil or groundwater or through airborne releases in vapors, fumes, or dust.

Under the Resource Conservation and Recovery Act (RCRA), the U.S. EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA was amended in 1984 by the Hazardous and Solid Waste Act (HSWA), which affirmed and extended the concept of regulating hazardous wastes from generation through disposal. HSWA specifically prohibits the use of certain techniques for the disposal of some types of hazardous wastes. Under RCRA, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as the federal RCRA requirements. U.S. EPA approved California’s program to implement federal regulations as of August 1, 1992.

DTSC administers the Hazardous Waste Control Law (HWCL). Under HWCL, DTSC has adopted extensive regulations governing the generation, transportation, and disposal of hazardous wastes. HWCL differs little from RCRA; both laws impose “cradle to grave” regulatory systems for handling hazardous wastes in a manner that protects human health and the environment. Regulations implementing HWCL are generally more stringent than regulations implementing RCRA. HWCL regulations list over 780 hazardous chemicals, as well as nearly 30 more common materials that may be hazardous, and establish criteria for identifying, packaging, and labeling hazardous wastes. They prescribe management practices for hazardous wastes; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

Under both RCRA and HWCL, hazardous waste manifests must be retained by the generator for a minimum of three years. Hazardous waste manifests list a description of the waste, its intended destination, and regulatory information about the waste. A copy of each manifest must be filed with DTSC. The generator must match copies of hazardous waste manifests with certification notices from the treatment, disposal, or recycling facility. Hazardous waste as defined in the Code of Federal Regulations title 40 (40 CFR) 261.20 and CCR title 22, Article 9 (including listed substances, 40 CFR 261.30) is disposed of in Class I landfills. California has enacted strict legislation for regulating Class I landfills (Health and Safety Code,

§§25209 - 25209.7). For example, the treatment zone of a Class I landfill must not extend more than five feet below the initial surface and the base of the zone must be a minimum of five feet above the highest anticipated elevation of underlying groundwater (Health and Safety Code, §25209.1(h)). The Health and Safety Code also requires Class I landfills to be equipped with liners, a leachate collection and removal system, and a groundwater monitoring system (Health and Safety Code, §25209.2(a)). Such systems must meet the requirements of DTSC and the SWRCB (Health and Safety Code, §25209.5).

In California, leftover latex or oil-based paint is considered a hazardous waste and must be managed appropriately. Many local environmental health, solid waste, or public works departments operate household hazardous waste (HHW) collection programs. These programs have been set up to collect, reuse, and recycle leftover paint from households.

Currently, there are three Class I landfills located in California. Chemical Waste Management Corporation in Kettleman City is a treatment, storage, and disposal facility that has a permitted capacity of 10 million cubic yards. At current disposal rates, this capacity would last for approximately 20 years (Hashemian, 1999). Safety-Kleen Corporation has a Class I facility in Buttonwillow, Kern County, with a permitted capacity of 10.7 million cubic yards (not yet constructed). The current remaining capacity is 0.3 million cubic yards. At current disposal rates, this capacity would last for approximately seven years. In addition, treatment services and landfill disposal are available from the Safety-Kleen facility located in Westmorland, Imperial County, with a permitted capacity of 2.6 million cubic yards (not yet constructed) and a current remaining capacity of 0.2 million cubic yards, which is estimated to last for approximately five years (Hashemian, 1999).

Hazardous waste can also be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; USPCI, Inc., in Murray, Utah; and Envirosafe Services of Idaho, Inc., in Mountain Home, Idaho. Incineration is provided at the following out-of-state facilities: Aptus, in Aragonite, Utah and Coffeyville, Kansas; Rollins Environmental Services, Inc., in Deer Park, Texas and Baton Rouge, Louisiana; Chemical Waste Management, Inc., in Port Arthur, Texas; and Waste Research & Reclamation Co. in Eau Claire, Wisconsin (SCAQMD, 1996).

G. HAZARDS

Hazards are related to the risks of fire, explosions, or releases of hazardous substances in the event of accident or upset conditions. Hazards are thus related to the production, use, storage, and transport of hazardous materials. Industrial production and processing facilities are potential sites for hazardous materials. Some facilities produce hazardous materials as their end product, while others use such materials as an input to their production processes. Examples of hazardous materials used by consumers include fuels, paints, paint thinner, nail polish, and solvents. Hazardous materials may be stored at facilities producing such materials and at facilities where hazardous materials are part of the production processes. Storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported throughout California in great quantities via all modes of transportation including rail, highway, water, air, and pipeline.

1. Hazardous Materials

State law requires detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of to prevent or mitigate injury to health or the environment in the event that such materials are accidentally released. OES enforces these requirements. Federal laws, such as the Emergency Planning and Community-Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act or SARA) impose similar requirements.

The U.S. Department of Transportation (U.S. DOT) has regulatory responsibility for the safe transport of hazardous materials between states and to foreign countries. U.S. DOT regulations govern all means of transportation, except for those packages shipped by mail. Hazardous materials sent by U.S. mail are covered by U.S. Postal Service (USPS) regulations. U.S. DOT regulations are contained in 49 CFR; USPS regulations are in 39 CFR. Common carriers are licensed by the California Highway Patrol (CHP), pursuant to the California Vehicle Code, §32000. This section requires licensing of every motor (common) carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous material of the type requiring placards. Common carriers conduct a large portion of their business in the delivery of hazardous materials.

The CHP and Caltrans have primary responsibility for enforcing federal and State regulations and responding to hazardous materials transportation emergencies. The CHP enforces hazardous materials and hazardous waste labeling and packaging regulations that prevent leakage and spills of material in transit and provide detailed information to cleanup crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP. The CHP also conducts regular inspections of licensed transporters to assure regulatory compliance. Caltrans has emergency chemical spill identification teams at 72 locations throughout California.

Pursuant to the Emergency Services Act, California has developed an Emergency Response Plan to coordinate emergency services provided by federal, State, and local government agencies and private persons. Response to hazardous materials incidents is one part of this plan. The Plan is administered by the Office of Emergency Services (OES), which coordinates the responses of other agencies including U.S. EPA, CHP, Department of Fish and Game, the applicable RWQCB, and local fire departments (see California Government Code, §8550).

In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985 (the Business Plan Law), local agencies are required to develop “area plans” for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification and coordination of affected government agencies and responsible parties, training, and follow-up.

Hazardous materials incidents are reported to OES, which compiles and archives the information. The data on accidental hazardous materials releases presented below are based on a database search of the OES Warning Center's Hazardous Material Spills Reports. Even though the record search disclosed these spills, it should be noted that there could have been other spills not reported to OES.

In 1998, 52 hazardous material releases of coatings solvents totaling 5,916 gallons were reported statewide. Also reported were 70 paint and coating product releases, totaling 2,408 gallons. Table III-3 shows reported releases of materials used to formulate coatings.

TABLE III-3
1998 HAZARDOUS MATERIALS RELEASE INFORMATION

Solvent	Reported Incidents	Amount (gallons)
Toluene	3	36
Xylenes	3	43
Methyl ethyl ketone	2	90
Mineral spirits*	2	231
Paint thinner*	13	120
Kerosene*	6	2,602
Naphtha*	3	65
Propylene glycol	1	14
Ethylene glycol	6	632
Methanol	3	1,002
Acetone	5	135
Ethanol	4	400
Texanol	1	546
Total	**52**	**5,916**

* Also referred to collectively as petroleum distillates
Source: Office of Emergency Services, 1999.

2. Human Health

As noted in Table III-4, architectural coatings are currently formulated with toxic substances with a range of adverse human health effects. The actual effects of exposure to coatings solvents, however, depend on such factors as the exposure duration, potency of the solvents of concern, exposure frequency, and other factors.

a. Public Health

The Toxic Air Contaminant Identification and Control Act (Health and Safety Code §§ 39650 *et seq.*, Food and Agriculture Code Sections 14021 *et seq.*) established

California's two-phased program to identify and control air toxics. In the first phase (risk assessment), the ARB selects substances for review, considering criteria relating to "the risk of harm to public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community" (Health and Safety Code § 39666(f)).

In the risk management phase of the program, the ARB reviews the emission sources of an identified toxic air contaminant (TAC) to determine if any regulatory action is necessary to reduce the risk. The analysis includes a review of controls already in place, the available technologies and associated costs for reducing emissions, and the associated risk.

Also in the risk management phase, the ARB, working closely with the air districts, is responsible for developing control measures for all identified toxic air contaminants except those used as pesticides. Pesticides are evaluated in a similar process by the Department of Pesticide Regulation. Following the ARB adoption of measures to control a specific toxic compound, the districts must adopt equal or more stringent regulations for the stationary sources in their jurisdiction. Regulations to control airborne toxic emissions from mobile sources are the responsibility of the ARB.

The Air Toxics Hot Spots Program (Health and Safety Code §§ 44300-44384) requires facilities to report their air toxics emissions, ascertain health risks, and to notify nearby residents of significant risks. Facilities that pose a significant health risk to the community are required to reduce their risk through a risk management plan.

b. Worker Safety Requirements

The California Occupational Safety and Health Administration (Cal/OSHA) and the Federal Occupational Safety and Health Administration (OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. In California, Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations. Under the authority of the Occupational Safety and Health Act of 1970, OSHA has adopted numerous regulations pertaining to worker safety (contained in 29 CFR). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling, including workplace conditions, employee protection requirements, first aid, and fire protection, as well as material handling and storage. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in 29 CFR.

Cal/OSHA regulations concerning the use of hazardous materials in the workplace (detailed in CCR, title 8) include requirements for employee safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces hazard communication program regulations containing training and information requirements, including procedures for identifying and labeling hazardous substances. The hazard communication program also requires that Material Safety Data Sheets (MSDSs) be available to employees and

TABLE III-4
TOXICITY OF CURRENTLY AVAILABLE COATINGS SOLVENTS

Solvent-borne Formulations				
Solvent	**TLV[a] (ppm)**	**PEL[b] (ppm)**	**IDLH[c] (ppm)**	**Health Hazard**
Petroleum distillates (naphtha)	100	400	10,000	Mild irritation; narcosis
Xylenes	100	100	1,000	Mild irritation - eye, nose, throat; narcosis; skin
Toluene	100	200	2,000	Moderate irritation - eye, nose, throat; narcosis: skin; suspect teratogen; mutagen
MEK	200	200	3,000	Mild irritation - eye, nose, throat; narcosis
Ethyl alcohol	1,000	1,000	3,300	Marked irritation - eye, nose, throat, skin; narcosis; reproductive impairment
2-propanol	400	400	12,000	Mild irritation - eye, nose, throat; narcosis
Isobutyl alcohol	50	100	8,000	Mild irritation - eye, nose, throat; suspect carcinogen
1,3,4-trimethyl benzene	25	25	N.A.[d]	Marked irritation - eye, nose, throat, skin; cumulative CNS effects; anemia
Stoddard solvent	100	500	5,000	Narcosis; mild irritant
Waterborne Formulations				
Solvent	**TLV (ppm)**	**PEL (ppm)**	**IDLH (ppm)**	**Health Hazard**
Propylene glycol	10mg/m 3	N.A.		Not determined
Ethylene glycol	50	N.A.	N.A.	Moderate irritation – eye, nose, throat, skin; CNS depression
Methanol	1,000	1,000	3,300	Marked irritation – eye, nose, throat, skin; narcosis; reproductive impairment
2-(2-methoxyethoxy) ethanol	N.A.	N.A.	N.A.	Not determined
EGME	5	25	N.A.	Cumulative CNS; skin; suspect reproductive effects; blood disorders
EGBE	25	50	700	Mild irritation - eye, nose, throat; anemia; skin
EGEE	5	200	N.A.	Cumulative blood damage; moderate irritation of eyes, throat, skin

[a] TLV = threshold limit value; source: American Conference of Government Industrial Hygienists

[b] PEL = permissible exposure limit; source: OSHA

[c] IDLH = immediately dangerous to life and health; source: National Institute for Occupational Safety and Health

[d] N.A. = not available

that employee information and training programs be documented. These regulations also require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and emergency evacuation training).

Both federal and State laws include special provisions for hazard communication to employees in research laboratories, including training in chemical work practices. The training must include instruction in methods for the safe handling of hazardous materials, an explanation of MSDSs, use of emergency response equipment and supplies, and an explanation of the building emergency response plan and procedures. Chemical safety information must also be available at the workplace. More detailed training and monitoring is required for the use of carcinogens, ethylene oxide, lead, asbestos, and certain other chemicals listed in 29 CFR. Emergency equipment and supplies, such as fire extinguishers, safety showers, and eye washes, must also be kept in accessible places. Compliance with these regulations reduces the risk of accidents and worker health effects.

The National Fire Code (NFC), Standard 45 (published by the National Fire Protection Association) contains standards for laboratories using chemicals that are not requirements, but are generally employed by organizations in order to protect workers. These standards provide basic protection of life and property in laboratory work areas through prevention and control of fires and explosions, and also serve to protect personnel from exposure to non-fire health hazards. While NFC Standard 45 is regarded as a nationally recognized standard, the California Fire Code (24 CCR) contains State standards for the use and storage of hazardous materials and special standards for buildings where hazardous materials are found. Some of these regulations consist of amendments to NFC Standard 45. California Fire Code regulations require emergency pre-fire plans to include training programs in first aid, the use of fire equipment, and methods of evacuation.

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IV.

ENVIRONMENTAL IMPACTS AND MITIGATION

A. INTRODUCTION

CEQA requires environmental documents to identify significant environmental effects that may result from a proposed project (CEQA Guidelines §15126(a) and §15126.2). Direct and indirect significant effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety problems caused by physical changes; and other aspects of the resource base, including water, scenic quality, and public services. If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4).

The CEQA Guidelines state that the degree of specificity required in a CEQA document depends on the type of project being proposed (CEQA Guidelines §15146). The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, the environmental document for projects such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan should focus on the secondary effects that can be expected to follow from the adoption or amendment, but the analysis need not be as detailed as the analysis of the specific construction projects that might follow. Therefore, this ~~Draft~~ Final Program EIR analyzes impacts on a statewide level, and also analyzes impacts at the district level to the maximum extent feasible. When adopting their architectural coatings rules, each district will need to decide if the ARB's analysis in this Program EIR is sufficient, or whether it is necessary to perform additional analysis for any district-specific impacts.

The categories of environmental impacts recommended for evaluation in a CEQA document are established by CEQA (Public Resources Code, §21000 *et seq*.) and the CEQA Guidelines, as promulgated by the State of California Secretary of Resources. Under the CEQA Guidelines, there are 16 environmental categories in which potential adverse impacts from a project are evaluated. Projects are evaluated against the environmental categories in an environmental checklist and those environmental categories that may be adversely affected by the project are further analyzed in the appropriate CEQA document.

Pursuant to CEQA, a NOP/IS including an environmental checklist were prepared for this project (see Appendix B). Of the 16 potential environmental impact categories on the checklist, it was determined that a ~~Draft~~ Final Program EIR should be prepared to address potential adverse effects on the following environmental categories: air quality, water, public services, transportation/circulation, solid waste/hazardous waste, and hazards. The following sections analyze the potential adverse environmental impacts associated with implementing the SCM.

B. THRESHOLDS OF SIGNIFICANCE

Neither CEQA nor the CEQA Guidelines describe specific thresholds of significance or how they may be used. Instead of dictating a one-size-fits-all approach, CEQA authorizes public agencies to adopt by “ordinance, resolution, rule or regulation” their own “objectives, criteria, and procedures for the evaluation of projects” (see Public Resources Code §21082).

Simply stated, the threshold of significance for a given environmental effect is that level at which the Lead Agency finds the effects of the project to be significant[1]. According to the Office of Planning and Research (OPR), a threshold of significance can be defined as: “A quantitative or qualitative standard, or set of criteria, pursuant to which the significance of a given environmental effect may be determined.”

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A threshold provides a rational basis for significance determinations. This complies with the CEQA Guidelines’ requirement that a Lead Agency's determination of significance be “based to the extent possible on scientific and factual data” (see CEQA Guidelines §15064(b)).

Ideally, a threshold of significance provides a clear differentiation of whether or not the project may result in a significant environmental effect. More practically, a threshold will assist the Lead Agency in making this determination. In either case, thresholds do not substitute for the agency's use of careful judgment in determining significance (see CEQA Guidelines §15064).

Thresholds may be either qualitative or quantitative. Some effects, such as traffic or noise, lend themselves to numerical standards. Others, such as aesthetics or wildlife habitat, are difficult to quantify and must rely upon qualitative descriptions. In either case, thresholds should be based on legal standards, studies, surveys, reports, or other data that can identify that point at which a given environmental effect becomes significant. Thresholds are intended to be analytical tools to assist in significance determinations, not rigid standards.

In devising thresholds of significance, OPR recommends that they be based on the following standards:

- A health-based standard such as air pollutant emission standards, water pollutant discharge standards, or noise levels.
- Service capacity standards such as traffic level of service, water supply capacity, or waste treatment plant capacity.
- Ecological tolerance standards such as physical carrying capacity, impacts on declared threatened or endangered species, loss of prime farmland, or wetland encroachment.

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[1] Additionally, a significant effect on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. CEQA Guidelines § 15382. An economic or social change by itself shall not be considered a significant effect on the environment. Id. A social or economic change related to a physical change may be considered in determining whether the physical change is significant. Id.

- Cultural resource standards such as impacts on historic structures or archaeological resources.
- Other standards relating to environmental quality issues, such as those listed in Appendix G – Initial Study Checklist of the CEQA Guidelines.

Most public agencies in California have not formally adopted a comprehensive set of significance thresholds as part of their local CEQA guidelines. To date, ARB has not formally adopted thresholds of significance. Where a Lead Agency has not adopted its own thresholds of significance, OPR recommends that the Lead Agency contact other agencies to discuss incorporation of their thresholds into its own analysis. The rationale for contacting other agencies is to reduce duplicative environmental reviews and take advantage of regulatory agency expertise.

For purposes of this Program EIR, the ARB will rely on the thresholds of significance (significance criteria) adopted by the SCAQMD and used in its analysis of the environmental impacts associated with implementation of Rule 1113 – Architectural Coatings. The basic reason for ARB's use of the SCAQMD's significance criteria is as follows: the SCAQMD generally has the worst air quality in California. As a result of their air quality problems, the SCAQMD's significance criteria tend to be the most conservative in California. Thus, using the SCAQMD's significance criteria will provide for a worst-case analysis for many identified environmental impact areas discussed below. In addition, using SCAQMD's significance criteria will provide consistency and harmonization between the ARB's analysis and the SCAQMD's environmental analysis for Rule 1113.

It should be noted that the use of the SCAQMD's significance criteria is not intended to supplant individual districts' CEQA significance criteria. As mentioned earlier, the proposed project is essentially a model rule that is designed to be considered by the districts when adopting architectural coatings rules. Therefore, if a district has different significance criteria for a particular environmental impact area, the district will need to decide whether to use those criteria in lieu of the criteria discussed in this ~~Draft~~ Final Program EIR. Appendix H contains a table of the significance criteria of most of the air districts, prepared for CAPCOA in 1998. The reader is referred to each environmental impact area section for the specific criteria used by the ARB for evaluating the environmental impacts associated with the implementation of the SCM.

C. ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

The following subsections contain the environmental impact analysis for the six topics identified in the NOP/IS as having potential impacts.

1. Air Quality

The primary objective of the proposed SCM is to set VOC limits and other requirements that are feasible (based on existing and currently developing coatings technology) and that will achieve significant reductions in VOC emissions from architectural coatings. The SCM is also intended to serve as a model rule (*i.e.*, a suggested control measure) that will provide a basis for uniformity among architectural coatings rules in California.

The proposed SCM sets allowable VOC content limits for a number of architectural coatings categories, including categories such as flat coatings, nonflat coatings, and specialty coatings. The proposed VOC limits would become effective on January 1, 2003, for all categories except industrial maintenance (IM) coatings, which have an effective date of January 1, 2004. Other components of the proposed SCM include a three-year "sell-through" provision (for coatings manufactured before the applicable effective dates), a petition provision to allow limited use of higher VOC industrial maintenance coatings in the San Francisco Bay Area, North Central Coast and North Coast Air Basins, definitions, test methods, standards for painting practices and thinning of coatings, container labeling requirements, an optional averaging provision (to be developed), and reporting requirements for perchloroethylene and methylene chloride. The complete text of the proposed SCM can be found in Appendix A.

Based on current estimates, implementation of the proposed SCM would result in approximately ~~11~~ 10 tons per day of VOC emission reductions statewide, excluding the SCAQMD[2], by the year 2004. See Section II-F and Table II-3 for more information.

Significance Criteria

The project will be considered to have significant adverse air quality impacts if any one of the thresholds in Table IV-1 are equaled or exceeded.

The objective of the SCM is to reduce VOC emissions from affected coatings categories. Analysis of the SCM indicates that the proposed project is expected to generate direct air quality benefits. The direct effect of implementing the SCM is a reduction of VOC emissions from affected coatings categories statewide.

a. Analysis of Industry Issues

Some industry representatives have alleged that the use of low-VOC coatings may create significant adverse air quality impacts. These issues were raised in the past during the development of the 1989 SCM and the adoption of various local district rules, and more recently, in comments submitted on the NOP/IS. To briefly summarize these issues, industry representatives contend that new solvent-borne or water-borne formulations to meet the proposed VOC content limits will result in more coatings use or the use of noncompliant coatings, and an overall increase in VOC emissions over time. Industry also contends that low-VOC reformulations will contain more reactive solvents, therefore contributing to a greater rate of ozone formation than conventional solvents.

To evaluate industry's claims of low-VOC coatings' poor performance, ARB staff reviewed the results of the NTS study, as described in Appendix D of this ~~Draft~~ Final Program EIR. Staff also reviewed the 1998 Architectural Coatings Survey data regarding market share of compliant coatings (see Table II-2). Lastly, staff reviewed product data sheets for over 500 conventional and low-VOC coatings to compare solids content by volume and area of

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[2] SCAQMD has already adopted the same or more stringent limits for most of the categories in the SCM in its Rule 1113~~; the SCM would result in an additional 0.15 ton per day emission reduction in the SCAQMD (from the interim limits)~~.

coverage, drying time, pot life (defined as the time interval after mixing of a multi-component coating during which the coating is usable with no difficulty), shelf life, and durability. Table IV-2 is a summary of these coatings characteristics grouped by coatings category as defined in the SCM (see Appendix E for details).

TABLE IV-1
SCAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
TAC, AHM, and Odor Thresholds		
Toxic Air Contaminants (TACs)	MICR $\geq$ 10 in 1 million* HI $\geq$ 1.0 (project increment) HI $\geq$ 5.0 (facility-wide)	
Accidental Release of Acutely Hazardous Materials (AHMs)	CAA §112(r) threshold quantities	
Odor	Project creates or is subjected to an objectionable odor > 10 D/T	
NO_2 1-hour average annual average	 20 ug/m^3 (= 1.0 pphm) 1 ug/m^3 (= 0.05 pphm)	
PM10 24-hour annual geometric mean	 2.5 ug/m^3 1.0 ug/m^3	
Sulfate 24-hour average	 1 ug/m^3	
CO 1-hour average 8-hour average	 1.1 mg/m^3 (= 1.0 ppm) 0.50 mg/m^3 (= 0.45 ppm)	

* Note: for purposes of the human health impacts analysis in this Program EIR, we used a MICR $\geq$ 1 in 1 million. Some districts use this threshold in their health risk analysis programs.

MICR = maximum individual cancer risk; HI = Hazard Index; D/T = dilution to threshold factor; ug/m^3 = microgram per cubic meter; pphm = parts per hundred million; mg/m^3 = milligram per cubic meter; ppm = parts per million; TAC = toxic air contaminant; AHM = acutely hazardous material

i. More Thickness

PROJECT SPECIFIC IMPACT: Some industry representatives contend that low-VOC water-borne and solvent-borne coatings are formulated with a high solids content and are therefore difficult to handle during application, tending to produce a thick film when applied directly from the can. A thicker film supposedly indicates that a smaller surface area is covered with a given

TABLE IV-2
SUMMARY OF COATINGS CHARACTERISTICS

Coating Category	# of samples	Range of VOC Content (gm/l)[1]	Average VOC Content (gm/l)[1]	Average % Solids by Volume	Average Coverage (sq ft/gal)	Average Drying Time (hrs) Between Coats	Average Pot Life* @70 deg. (hrs)	Average Shelf Life (yrs)
Lacquers (>680 g/l)	13	~~687-755~~ 687-719	~~717~~ 707	~~16.8~~ 17.7	~~286~~ 302	0.5	n/a	1
Lacquers (>550-680 g/l)	~~63~~ 54	~~550-680~~ 560-680	~~651~~ 664.3	~~23.5~~ 21.3	~~324~~ 305	~~1.3~~ 0.7	n/a	1
Lacquers (≤550 g/l)	~~56~~ 41	64-550	~~260~~ 301.9	~~32.3~~ 26.8	~~435~~ 363	~~5.5~~ 1.0	n/a	1
Flats (250-100 g/l)	~~95~~ 97	102-250	~~153.3~~ 152.1	~~32.6~~ 32.8	~~360~~ 361	~~3.9~~ 4.3	n/a	1.1
Flats (<100 g/l)	~~40~~ 38	0-<100	~~51.6~~ 50.8	~~34.9~~ 34.6	~~337~~ 333	~~4.2~~ 3.0	N/a	1.3
Floor Coatings (>~~100~~ 250 g/l)	~~13~~ 11	~~111-463~~ 258-463	~~282~~ 350.9	~~49.4~~ 51.6	~~341~~ 361	n/a	~~7~~ 6.8	~~2~~ 2.1
Floor Coatings (100-250 g/l)	~~4~~ 23	~~79-102~~ 104-250	~~91~~ 177.2	~~69.3~~ 52.8	~~278~~ 334	n/a	~~2.3~~ 3	~~2~~ 1.7
Floor Coatings (<~~50~~100 g/l)	~~13~~ 25	~~0-30~~ 0-97	~~2.5~~ 20	~~79.5~~ 75.2	~~370~~ 300	n/a	1.9	~~1.3~~ 1.6
Industrial Maintenance Coatings (420-250 g/l)	40	257-420	353	56	337	n/a	6.4	1.0
Industrial Maintenance Coatings (250-100 g/l)	~~24~~ 20	~~114~~ 134-258	~~187~~ 202	~~55~~ 58	~~277~~ 239	n/a	~~5.2~~ 5.7	1.2
Industrial Maintenance Coatings (<100 g/l)	~~39~~ 33	0-108	~~44~~ 39	~~72~~ 76	~~305~~ 307	n/a	2.5	~~1.1~~ 1.0
Nonflats (250-150 g/l)	~~10~~ 13	~~215~~ 157-<380	~~223~~ 197.8	~~35.5~~ 36.1	~~403~~ 398	~~8.4~~ 7.4	n/a	1
Nonflats (150-50 g/l)	11	~~70-135~~ 77-157	~~88.9~~ 108.8	~~39~~ 37.9	~~340~~ 342	~~8~~ 10.1	n/a	1
Nonflats (<50 g/l)	~~15~~ 12	0-50	~~11.8~~ 4.2	38.8 40.0	~~408~~ 410	~~6.5~~ 4.9	n/a	1
Quick Dry Enamels (400-250 g/l)	3	400	400	50.5	421	14.3	n/a	-
Quick Dry Enamels (<250 g/l)	~~9~~ 8	~~75~~ 157-249	~~190.3~~ 216.3	~~36.3~~ 36.0	~~374~~ 370	~~5~~ 5.2	n/a	1

** For two-component coatings only*

TABLE IV-2 (CONTINUED)
SUMMARY OF COATINGS CHARACTERISTICS

Coating Category	# of samples	Range of VOC Content (gm/l)[1]	Average VOC Content (gm/l)[1]	Average % Solids by Volume	Average Coverage (sq ft/gal) @ ~3 mil	Average Drying Time (hrs) Between Coats	Average Pot Life* @70 deg. (hrs)	Average Shelf Life (yrs)
Primer, Sealer, Undercoater (350-200 g/l)	16	250-350	325	54.3	390	15	7**	1.4
Primer, Sealer, Undercoater (200-100 g/l)	~~6~~ 7	124-206	~~171.3~~ 165.4	~~43.7~~ 43.1	~~341~~ 320	~~3.4~~ 6.4	6**	~~2.3~~ 2.1
Primer, Sealer, Undercoater (<100 g/l)	~~13~~ 12	0-109	~~62.7~~ 71.5	~~36.2~~ 35.9	~~398~~ 415	~~6.7~~ 5.3	2.4**	~~2.5~~ 2.6
Quick Dry Primer, Sealer, Undercoater (exempt – 200 g/l)	2	560	560	27.0	600	2.5	n/a	3
Quick Dry Primer, Sealer, Undercoater (200-100 g/l)	2	118-130	124	43	385	1.5	n/a	1
Quick Dry Primer, Sealer, Undercoater (<100 g/l)	8	0-108	71.5	39.3	381	2.2	n/a	1.0
Water Proofing Sealer (400-250 g/l)	~~4~~ 21	~~400~~ 272-400	~~400~~ 352	~~15.8~~ 35.6	~~144~~ 264.3	n/a	n/a	1.0
Water Proofing Sealer (<250 g/l)	~~9~~ 31	~~0-234~~ 0-245	~~99.8~~ 93.9	~~36.2~~ 32.1	~~204~~ 184	n/a	~~4.6**~~ 4.5**	1.6
Stains (350-250 g/l)	~~2~~ 12	~~350~~ 256-350	~~350~~ 323.8	~~55.6~~ 48.2	~~450~~ 354	~~24~~ 16	n/a	~~3~~ 7.5
Stains (<250 g/l)	~~10~~ 24	0-250	~~131.9~~ 150.7	~~25.4~~ 27.6	~~288~~ 322	~~7.9~~ 10.1	n/a	~~4.5~~ 3.8

[1] *Unless otherwise noted, units are grams of VOC per liter of coating, less water and exempt solvents.*

* *For two-component coatings only*

** *Represents only a few products in the category*

amount of material, thereby increasing VOC emissions per unit of area covered as compared to conventional coatings.

ANALYSIS: ARB staff analyzed the solids content and coverage area for a number of major coating categories using product data sheets from over 500 coatings (see Table IV-2) and information obtained from the 1998 ARB Architectural Coatings Survey (see Table IV-3). We did not detect a consistent relationship between VOC content and solids content. While some lower-VOC coatings appear to have higher solids than higher-VOC coatings (*e.g.*, lacquers, floor coatings, IM coatings), others appear to have similar or lower solids than higher-VOC coatings (*e.g.*, flats; nonflats; primers, sealers and undercoaters; quick dry primers, sealers and undercoaters, waterproofing sealers, and stains).

Further, we did not detect a consistent relationship between solids content and coverage area (see Appendix E). We first looked at coatings where a lower VOC content appeared to correspond with a higher solids content. For IM coatings, coverage appears to decrease with increased solids content. For floor coatings, coverage appears to be unchanged with increased solids content. For lacquers, coverage appears to increase with increased solids content. We also looked at coatings where a lower VOC content appeared to correspond with a lower solids content. For stains, although the sample size is small, coverage appears to decrease with decreased solids content. For primers, sealers and undercoaters, coverage appears to be unaffected by decreased solids content.

The "more thickness" issue aside, if industry's allegations regarding increased coatings use due to less coverage were true, we would expect to see a corresponding increase in per capita sales. ARB survey data show that estimated per capita use of architectural coatings has remained remarkably constant since 1988 (ARB, 1991, 1999c). Per capita estimated sales in 1988 are estimated to be 2.7 gallons, and in 1996, estimated per capita sales are 2.7 gallons. Over the same period of time, emissions from the use of architectural coatings have decreased from 3.4 pounds per capita in 1988 to 2.6 pounds per capita in 1996. If usage were increasing because of less coverage, the surveys would reflect this.

CONCLUSION: ARB staff concludes that the data do not support industry's assertion that compliant low-VOC coatings are necessarily formulated with a higher solids content than conventional coatings. Further, the data do not support industry's assertion that there is an inverse correlation between solids content and coverage area. Finally, coatings use does not appear to be increasing due to less coverage. Consequently, claims of significant adverse air quality impacts resulting from more thickness are unfounded.

ii. Illegal Thinning

PROJECT SPECIFIC IMPACT: Some manufacturers have asserted that thinning occurs in the field in excess of what is allowed by the SCM. It is asserted that because low-VOC water-borne and solvent-borne coatings are more viscous due to a high solids content, painters have to adjust the properties of the coatings to make them easier to handle and apply. In particular for solvent-borne coatings, this adjustment consists of thinning the coating as supplied by the manufacturer by adding solvent to reduce its viscosity. The added solvent allegedly increases VOC emissions back to or sometimes above the level of older formulations.

Industry representatives have also asserted that manufacturers will reformulate coatings to meet the SCM VOC content limits by merely increasing the solids content, which would produce a thicker film. Industry claims that a thicker film means less coverage and thinning will occur to obtain the same coverage area as conventional coatings, resulting in more VOC emissions per area covered.

ANALYSIS: As shown in Table IV-2 (see also the "More Thickness" discussion), the area of coverage of low-VOC coatings is generally comparable to that of conventional coatings. It is therefore unlikely that a coatings applicator, whether a contractor or do-it-yourselfer, will have to thin low-VOC, solvent-borne coatings to obtain the same coverage.

TABLE IV-3
VOC CONTENT VS. SOLIDS BY VOLUME

	ARB Survey Results	
Coating Types	**Sales Weighted Average VOC Content (gm/l)[1]**	**Sales Weighted Average Solids by Volume (%)**
Lacquers (>550 g/l)	658	21
Lacquers (<550 g/l)	360	30
Flats (>100 g/l)	132	35
Flats (<100 g/l)	61	35
Floor Coatings (>~~100~~ 250 g/l)	~~225~~ 376	~~42~~ 54
Floor Coatings (<~~100~~ 250 g/l)	~~31~~ 118	~~79~~ 55
IM Coatings (>250 g/l)	373	54
IM Coatings (<250 g/l)	111	76
Nonflats (>150 g/l)	218	37
Nonflats (<150 g/l)	114	37
Quick Dry Enamels (>250 g/l)	403	50
Quick Dry Enamels (<250 g/l)	n/a	n/a
PSU (>200 g/l)	355	51
PSU (<200 g/l)	103	32
Quick Dry PSU (>200 g/l)	407	44
Quick Dry PSU (<200 g/l)	104	43
Water Proofing Sealer (>250 g/l)	362	39
Water Proofing Sealer (<250 g/l)	151	26
Stains(>250 g/l)	419	40
Stains(<250 g/l)	135	34

[1] Unless otherwise noted, units are grams of VOC per liter of coating, less water and exempt solvents.

In addition, the majority of reformulated compliant coatings are water-borne or will use exempt solvents. Since exempt solvents are not considered reactive VOCs, thinning with these solvents would not increase VOC emissions. Water-based coatings are thinned with water and therefore thinning would not result in increased VOC emissions.

The ARB staff is not aware of information that demonstrates trends in the use of paint thinners. However, a number of studies have addressed the thinning issue. The results are detailed below:

- In mid-1991, the ARB conducted a field study of thinning in regions of California that have established VOC limits for architectural coatings (ARB, 1991). A total of 85 sites where painting was in progress were investigated. A total of 121 coatings were in use at these sites, of which 52 were specialty coatings. The overall result of this study was that only six percent of the coatings were thinned in excess of the required VOC limit, indicating a 94 percent compliance rate.

- The SCAQMD contracted with an environmental consulting firm to study thinning practices in the SCAQMD (SCAQMD, 1993a). In Phase I of the study, consumers who had just purchased paints were interviewed as they left stores located in different areas of the district. Of 70 solvent-borne paint users interviewed, only three indicated that they planned to thin their coatings before use. In Phase II of the study, paint samples were collected from painting contractors. None of the four solvent-borne samples collected were thinned.

- During the 1996 Rule 1113 amendments, SCAQMD staff conducted over 60 unannounced site visits to industrial parks and new residential construction sites to survey contractors regarding their thinning practices, coatings application techniques, and clean-up practices (SCAQMD, 1999). Samples of coatings, as supplied and as applied, were also collected during these site visits for laboratory analysis and subsequent study of thinning practices. Out of the 91 samples taken, only nine were thinned with solvents. Out of the nine thinned samples, only two were thinned to the extent that the VOC content exceeded the applicable rule limit. In addition, during pre-arranged visits, excessive thinning was observed at only one site at a 1:2 ratio. At this level, the coating was thinned to the point where, according to the professional contractor using it, it did not provide adequate hiding and he had to apply several coats. The practice of over-thinning is expected to inhibit hiding power, application properties, and drying time of a coating, which would likely discourage the practice. Simply put, a painter who overthins a can of paint would quickly discover that the overthinning works so poorly that he or she would likely never do it again.

- Subsequent to the amendments to Rule 1113 in November 1996, SCAQMD staff took coatings samples from 47 sites with ongoing painting operations (SCAQMD, 1999). Three of 20 solvent-borne samples (all IM coatings) were thinned with solvent prior to use, with none exceeding the compliance limit.

In an effort to verify industry's claims of increased thinning due to implementation of Rule 1113, the SCAQMD, in addition to conducting the studies described above, has specifically asked for empirical data from the paint industry on a number of occasions over the last nine years. To date, neither the SCAQMD nor the ARB has received any countervailing empirical data from the coatings industry, or from any other source, to indicate that thinning is occurring to a greater extent than the above data would indicate.

CONCLUSION: Current practice indicates that coatings applicators do not engage in widespread thinning, and even when thinning occurs, the coating's VOC content limits are rarely exceeded. Furthermore, excessive thinning is not expected to be a problem because a majority of the coatings that would comply with the SCM's limits will be water-borne formulations. Other compliant coatings are available that may be applied without thinning. Lastly, even if some thinning occurs, thinning would likely be done with water or exempt solvents. As a result, claims of thinning resulting in significant adverse air quality impacts are unfounded.

iii. More Priming

<u>PROJECT SPECIFIC IMPACT</u>: Some coatings manufacturers and contractors have asserted that low-VOC water-borne and solvent-borne topcoats do not adhere to unprimed substrates as well as higher-VOC solvent-borne topcoats. Therefore, the substrates must be primed with solvent-borne primers to enhance adherence. Industry representatives have also stated that the use of water-borne compliant topcoats could require more priming to promote adhesion.

<u>ANALYSIS</u>: Results of the NTS study show that when compared to conventional, currently compliant coatings, low-VOC coatings have similar performance and application characteristics (see Appendix D). In addition, manufacturers' testing shows that a majority of the low-VOC (<250 g/l) IM coatings passed adhesion tests, such as ASTM test methods D4541, D3359-78, D2197, or D412 (see Appendix E). Furthermore, according to ARB survey data, the amount of solvent-borne primers, sealers, and undercoaters relative to the total amount of architectural coatings sold has remained constant, at about seven percent, since 1984 (ARB, 1986, 1991, 1999c). In addition, as mentioned above, the ARB's surveys do not show a significant increase in per capita coatings use. If a trend had developed where more primers were being used prior to the application of topcoats, the survey data would be expected to reflect this trend as an increase in the overall use of architectural coatings.

Surface preparation is also related to the issue of priming. Manufacturers' recommendations for surface preparation are the same for conventional and low-VOC coatings (*i.e.*, apply to clean, dry surfaces). It is not expected that these recommendations would change if additional coatings were to be reformulated as a result of the SCM.

At any rate, the issue of more priming is only relevant for a few uses for which a specialty primer category is available. (The SCM allows higher VOC contents for these specialty primers.) The majority of coatings are flats and nonflats where special priming concerns are not an issue. Even if more primers were used for some flats and nonflats, they would be water-borne primers that would not significantly increase VOC emissions.

<u>CONCLUSION</u>: ARB staff concludes more primers are not needed because low-VOC coatings have similar adhesion qualities as conventional coatings. The amount of solvent-borne primers, sealers, and undercoaters relative to the total amount of coatings sold has remained constant since 1984. Low-VOC coatings also do not require different surface preparation than conventional coatings. Finally, the SCM allows the use of specialty primers for those situations that require them. Consequently, claims of significant adverse air quality impacts resulting from more priming are unfounded.

iv. More Topcoats

<u>PROJECT-SPECIFIC IMPACTS</u>: Some coatings manufacturers and contractors assert that low-VOC water-borne and solvent-borne topcoats may not cover, build (the wet or dry thickness of a coating film), or flow-and-level (the flow out of a paint so that when the film is dry, it shows no brush marks or ripples) as well as higher-VOC solvent-borne formulations. Therefore, more coats are necessary to achieve equivalent cover and coating build-up.

ANALYSIS: Results of the NTS study show that low-VOC and conventional topcoats (nonflats and IM coatings) have comparable cover, build, and flow-and-level characteristics (see ~~Appendix D~~ Chapter VI and Appendix E in the Staff Report for details). Furthermore, most flats and nonflats are already well below the proposed limits in the SCM. As shown in the ARB survey data, per capita sales of nonflats and IM coatings have not increased historically, and a per capita sales increase would be expected to occur if more coats of paint were actually needed (ARB, 1986, 1991, 1999c).

Technology breakthroughs over the past several years have resulted in the marketing of acrylic-based, water-borne flat coatings that exhibit performance characteristics that are equivalent or superior to traditional solvent-borne coatings (SCAQMD, 1999). Several coatings manufacturers now formulate low-VOC nonflat coatings (<150 g/l) with high build, and some manufacturers also formulate even lower VOC (<50 g/l) coatings that also demonstrate excellent hide. Technology breakthroughs in additives include the following:

- Flow and leveling agents that have mitigated flow problems, even on substrates like plastics, glass, concrete, and resinous wood. These additives even assist in overcoming flow and leveling problems when coating oily or contaminated substrates.
- Pigment-wetting agents that have assisted in better dispersion of organic pigments in an aqueous media by altering their hydrophobic nature. This results in better flow characteristics.
- Defoamers and microfoam agents that have mitigated bubble retention problems, thereby eliminating the loss of drying capacity and thus improving the film.
- Biocides that are not susceptible to degradation by hydrolysis and that have provided good stability and eliminated settling problems.

From 1991 to 1992, the Ventura County Air Pollution Control District (VCAPCD) conducted performance tests on 49 different coatings representing clear wood finishes, quick dry enamels, quick dry primers, and industrial maintenance coatings (SCAQMD, 1999). Both brush and spray applications were tested. The performance tests evaluated ease of application, appearance, adhesion, hardness of topcoat, ability to cover extreme surface conditions (rusty metal, charred wood), and appearance after six months. A painter with Ventura County's Department of Facilities and Grounds did the painting and judged the application and appearance. Several observers from paint manufacturers and paint contractors oversaw the testing process. They found that these coatings performed well and that additional topcoats were not required.

CONCLUSION: ARB staff concludes that low-VOC and conventional coatings are comparable in terms of cover, build, and flow-and-level. Therefore, low-VOC coatings should not require additional topcoats. Consequently, claims of significant adverse air quality impacts resulting from more topcoats are unfounded.

v. More Touch-Ups and Repair Work

PROJECT-SPECIFIC IMPACTS: Some coatings manufacturers and contractors assert that water-borne and low-VOC solvent-borne formulations dry slowly and are susceptible to damage such as sagging, wrinkling, alligatoring (breaks in the paint film surface having the appearance of alligator skin), or becoming scraped and scratched. Some industry representatives contend that low-VOC, acetone-borne lacquers, water-borne topcoats, and substitutes will require more touch-ups and repair work because longer drying times allow for the contamination of the coated surface with airborne dust and construction debris. Once the topcoat becomes contaminated and is no longer smooth or aesthetically pleasing, touch-ups and repairs may be required. Industry also claims that high-solids, solvent-borne alkyd enamels tend to yellow in dark areas, and that water-borne coatings tend to blister or peel and result in severe blocking problems. All of these problems are claimed to result in the need to apply additional coatings for repair and touch-up.

ANALYSIS: According to the product data sheets reviewed by ARB staff, the average drying time between coats for low-VOC coatings was similar to or less than the average drying time for conventional coatings in all categories except lacquers (see Table IV-2 and the tables in Appendix E). Results of the NTS study also show that when compared to conventional, currently compliant coatings, low-VOC coatings have similar performance and application characteristics (see Chapter VI and Appendix ~~D~~ E of the Staff Report). Staff's review of product data sheets revealed that water-borne coatings are resistant to chemicals, corrosion, chalk, impact, and abrasion. Similar to their conventional counterparts, water-borne coatings retain gloss and color, and adhere well to a variety of substrates. Further, both low-VOC coatings and conventional coatings pass abrasion and impact resistance tests, and are considered to have proven durability qualities. Some low-VOC epoxy and urethane systems perform significantly better than their alkyd-based counterparts. Examples of these coatings can be found in Appendix E.

Finally, if more touch-up and repairs were required for low-VOC coatings, one would expect to see a corresponding increase in coatings sales. As discussed previously, per capita coatings sales have remained remarkably constant since 1988 (ARB, 1991, 1999c).

CONCLUSION: Based on results of the NTS study and information contained in the coatings product data sheets, ARB staff does not anticipate that low-VOC coatings will require more touch-up and repair work. Consequently, industry's claims of resulting adverse air quality impacts from more touch-up and repair work are unfounded.

vi. More Frequent Recoating

PROJECT-SPECIFIC IMPACT: Some coatings manufacturers and contractors assert that the durability of compliant water-borne and low-VOC, solvent-borne coatings is inferior to that of traditional solvent-borne coatings. Durability problems include cracking, peeling, excessive chalking, and color fading, all of which typically result in more frequent recoating. As a result, manufacturers and contractors claim that more frequent recoating would be necessary, resulting in greater total emissions than is the case for conventional coatings.

ANALYSIS: The durability of a coating is dependent on many factors, including surface preparation, application technique, exposure conditions (*e.g.*, mechanical stresses, chemicals, and weathering), type of binder in the formulation, and substrate coated. Results of the NTS study show that when compared to conventional, currently compliant coatings, low-VOC coatings have similar performance and application characteristics (see Chapter VI and Appendix ~~D~~ E of the Staff Report).

Regarding surface preparation, manufacturers' recommendations are the same for conventional and low-VOC coatings (*i.e.*, apply to clean, dry surfaces). It is not expected that these recommendations would change if additional coatings were to be reformulated as a result of the SCM.

Application techniques do not differ significantly between compliant low-VOC coatings and conventional coatings. Therefore, it is expected that if low-VOC coatings are applied according to manufacturers' recommendations, they should be as durable as conventional coatings. Other key durability characteristics considered by the staff include resistance to scrub or abrasion, corrosion, chemicals, impact, stains, and ultraviolet (UV) light. This evaluation revealed that compliant low-VOC coatings have durability characteristics similar to conventional coatings.

As mentioned previously, the durability of a coating is also governed by the nature of the binder used in its formulation (binders are also known as film formers or resins). The major impact on the coating film is oxidation by exposure to light, causing the film to first lose color and gloss, and gradually become brittle and incoherent. This condition, mainly caused by photochemical degradation, is especially a problem for coatings used for exterior painting. The coatings industry has developed a variety of additives acting as UV absorbers or free radical scavengers that ultimately slow down the photooxidative process, thereby increasing coating life. Antioxidants and sterically hindered amines are two classes of free radical scavengers, also known as hindered amine light stabilizers. These can be used with solvent-free or water-borne coatings. Other additives that enhance durability include adhesion promoters, corrosion inhibitors, curing agents, reactive diluents, optical brighteners, and algicides/mildewcides.

The most commonly used binders in architectural coatings are acrylics and alkyds. Table IV-4 below, extracted from material provided as part of the Durability and Performance of Coatings seminar held by Eastern Michigan University, describes some typical characteristics and highlights strengths and weaknesses of each resin type (SCAQMD, 1999). The table clearly emphasizes the superior durability of acrylic coatings. Using available additives that improve application and durability characteristics, properly formulated water-borne acrylic systems generally outperform solvent-borne coatings.

Water-borne coatings for IM applications are resistant to chemicals, corrosion, chalk, and abrasion (SCAQMD, 1999). Both water-borne and solvent-borne low-VOC IM coating formulations have passed abrasion and impact resistance tests, such as ASTM test methods D4060 and G14, respectively. Similar to their conventional counterparts, water-borne IM coatings also tend to retain gloss and color.

CONCLUSION: ARB staff concludes that low-VOC coatings for both architectural and IM applications are durable and long lasting. Any durability problems experienced by low-VOC coatings are no different than those seen with conventional coatings. Recent coatings technology has improved the durability of new coatings. Because low-VOC coatings are as durable as conventional coatings, more frequent recoating is not necessary. Consequently, claims of significant adverse air quality impacts resulting from more frequent recoating are unfounded.

TABLE IV-4
PERFORMANCE COMPARISON OF ACRYLIC AND ALKYD RESIN SYSTEMS

Acrylic Coatings	Alkyd Coatings
Excellent exterior durability because of high degree of resistance to thermal, photooxidation, and hydrolysis – Pendant groups are ester bonds, but body is C-C bonds, which are much harder to break.	Limited exterior durability because prone to hydrolysis.
Very good color and gloss retention, and resistance to embrittlement	Embrittlement and discoloration issues with age
Require good surface preparation. Since the surface tension is high, the substrate surface needs to be cleaner before application	Minimal surface preparation requirements due to low surface tension. Relatively foolproof applications
Acrylic coatings are generally higher in cost	Lower costs
Polyurethane modified acrylics perform even better, especially in flexibility	Rapid drying, good adhesion, and mar resistance. Silicone modified alkyds have higher performance
Low-VOC and solvent-free formulations available	Higher VOC formulations

vii. Substitution

PROJECT-SPECIFIC IMPACT: Some coatings manufacturers and contractors assert that because water-borne and low-VOC solvent-borne coatings are inferior in durability and more difficult to apply, consumers and contractors will substitute allegedly better performing, higher VOC coatings from other categories for use in categories with low VOC compliance limits. An example of this substitution would be the use of a rust preventative coating, which has a higher VOC content limit requirement, in place of an IM coating or a nonflat coating.

ANALYSIS: There are several reasons why ARB staff believes that widespread substitution will not occur as a result of implementing the SCM. First, based on results of the NTS study (Appendix D) and ARB staff's research of resin manufacturers' and coatings formulators' product data sheets, a substantial number of low-VOC coatings are currently available with performance characteristics comparable to conventional coatings (see the tables in Appendix E and Table IV-2). Second, the SCM prohibits the application of certain coatings in specific settings. For example, rust preventative coatings cannot be used in industrial settings. (The SCM has a reporting requirement to track the use of rust preventative coatings and specialty primers.) Also, the type of performance (*i.e.*, durability) desired in some settings would strongly discourage the use of certain coatings. For example, in an IM setting, a coating with a life of 10 years or more is typically desired due to the harshness of the environment. Therefore, it is unlikely that an alkyd-based rust preventative coating with a typical life of five years would be used in place of an IM coating. Lastly, the SCM requires that when a manufacturer makes any representation that a coating can be used in more than one coating category, the lower limit of the two categories is applicable.

CONCLUSION: ARB staff does not expect that low-VOC coatings will be substituted with higher-VOC coatings. Currently, there are a substantial number of low-VOC coatings with performance characteristics comparable to conventional coatings. Consequently, claims of significant adverse air quality impacts resulting from substitution are unfounded.

viii. More Reactivity

PROJECT-SPECIFIC IMPACT: Different types of solvents have different degrees of "reactivity," which refers to a compound's ability to accelerate the formation of ground-level ozone. Some industry representatives claim that requiring manufacturers to reformulate to water-borne technology will lead to increases in ozone formation because the VOCs used in water-borne coatings are more reactive than those used in solvent-borne coatings. They have also suggested that the VOCs used in architectural coatings, such as mineral spirits, are low reactive, and thus, do not contribute to ozone formation. It has also been contended by industry that NO_x control alone may be most appropriate for reducing ground level ozone. Furthermore, some industry representatives claim that mass-based controls may not be effective and that reducing VOCs under certain conditions may actually lead to ozone nonattainment (Kessler, 1999; EL RAP, 1996; 1998).

ANALYSIS:

a. The Reactivity of Water-borne and Solvent-borne Products

As mentioned above, some industry representatives have asserted that many of the VOCs used in water-borne architectural coatings are more reactive than the VOCs used in solvent-borne coatings (EL RAP, 1996). It is further claimed that prescribing lower mass-based VOC limits, which may force reformulation to water-borne technology, will lead to overall increases in ozone formation from the category.

The existing data (ARB, 1999c) do not support the claim that water-borne coatings are more reactive than solvent-borne. Using the Maximum Incremental Reactivity (MIR) scale as the basis for comparing reactivities of VOCs, it is true that, on a per gram basis, some VOCs used in water-borne coatings are more reactive than some VOCs used in solvent-borne coatings (Carter, 1999a). For example, using the MIR scale as the basis, a typical VOC used in water-borne coatings, such as propylene glycol, is two to three times more reactive than a typical mineral spirit used in a solvent-borne coating. However, the reactivity of propylene glycol is approximately three times less reactive (again on a per gram basis) than that of other VOCs used extensively in solvent-borne coatings such as xylenes and toluene. It should also be noted that the reactivity of 2,2,3-trimethyl-1,3-pentanediol isobutyrate (Texanol), a VOC used extensively in water-borne coatings, has a similar reactivity estimate as a typical mineral spirit used in solvent-borne coatings (Carter, 1999c).

However, rather than comparing the reactivities of individual VOCs, the more appropriate method to compare reactivities of water-borne versus solvent-borne coatings is to look at the total, or weighted, reactivity of a product or product category. To do this, weighted species profiles were developed for water-borne and solvent-borne coatings using ARB survey data (actual data not provided due to confidentiality) (ARB, 1999c). This comparison of species profiles provides strong evidence that reformulating from solvent-borne to water-borne coatings to reduce total VOC content is an effective strategy to reduce the ozone formation potential from the architectural coatings category as a whole. In fact, the comparison found that, on a weighted basis, solvent-borne coatings are over two times more reactive than water-borne coatings. The analysis is described in greater detail below.

First, we analyzed the reported ARB survey data and found that 82 percent of coatings used in California are water-borne, yet water-borne coatings account for only 33 percent of the total emissions (ARB, 1999c). Conversely, while only 18 percent of total sales are solvent-borne coatings, they account for 67 percent of the emissions (ARB, 1999c). We then conducted a more detailed assessment of the reactivity of the emissions from water-borne and solvent-borne categories to determine if the water-borne coatings emissions were more reactive than those of solvent-borne coatings.

Five categories of architectural coatings were selected for the analysis because the products in these categories may be challenged to reformulate from solvent-borne to water-borne technology. The coatings categories used in our evaluation are: 1) Primers, Sealers, and Undercoaters; 2) Semitransparent Stains; 3) Quick Dry Enamels; 4) Quick Dry Primers, Sealers, and Undercoaters; and 5) Industrial Maintenance Coatings. To protect data confidentiality, the five categories were aggregated to create a single water-borne species profile and a single solvent-borne species profile. In aggregate, the survey data show that for these five categories, the product sales are 91,361,273 pounds per year, of which 30 percent (27,552,785 pounds per year) are water-borne and 70 percent (63,808,488 pounds per year) are solvent-borne. When the ozone formation potential of these categories is considered (using the MIR scale), water-borne products contribute 17 percent of the ozone formation potential (15,765,198 pounds of ozone), while solvent-borne products contribute 83 percent (78,272,991 pounds of ozone). Dividing the pounds of ozone potentially produced by the pounds of product sales shows that, solvent-borne products produce more ozone per pound of product than water-borne products. In fact, when the weighted, aggregated speciation profile is considered, water-borne products produce 0.57 pound of ozone per pound of product, while solvent-borne products produce 1.23 pounds of ozone per pound of product. Therefore, we conclude that solvent-borne coatings have the potential to form more than *twice* as much ozone as water-borne products. (Ozone formation potentials for the ingredients categorized under aggregated VOCs < 1.0%; proprietary VOCs; and other VOCs are calculated using the sales weighted average of the speciated VOCs that altogether comprise more than 95% of the water-borne or solvent-borne VOC inventory, respectively.)

Based on this analysis, there is no basis to conclude that reformulation to water-borne coatings would cause an increase in ozone formation. Rather, reformulation to water-borne coatings should lead to a decrease in ozone formation from architectural coatings.

b. The Effectiveness of Mass–based Controls for Reducing Ozone

It has been claimed that establishing mass-based limits may actually lead to increases in ground level ozone formation (EL RAP, 1998). However, no comprehensive studies were available that substantiate this claim. To the contrary, data support a conclusion that mass-based VOC control strategies have been and continue to be an effective means to reduce formation of ground level ozone. As shown in Table IV-5 below, between 1980 to1998, the number of days that the South Coast Air Basin has exceeded the federal ozone standard has decreased from

167 days in 1980 to 60 days in 1998. During this same period, the maximum one-hour ozone concentrations have decreased from 0.49 parts-per-million (ppm) in 1980 to 0.24 ppm in 1998. Virtually all of the emission reductions were due to mass-based control of VOCs and NO_X. In one study, Fiore *et al*. suggested that decreasing trends in ground-level ozone from 1980 through 1995 are attributed to emission controls (Fiore *et al.*, 1998).

c. Reactivity of "Mineral Spirits"

Industry representatives have asserted that the organic compounds contained in solvent-borne coatings (primarily mineral spirits), are not sufficiently reactive to contribute to the maintenance of ozone levels in excess of the standard (Smiland and Khachigian, 1999).

The ARB staff does not agree. "Mineral spirits" is a term that generally refers to various hydrocarbon solvents that are commonly used in solvent-borne paints and other products. Even though not all commercially available hydrocarbon solvents, or mineral spirits, have been studied in terms of their ozone formation potential, existing data indicate that hydrocarbon solvents are reactive and are likely to form ozone once emitted. For example, in his latest compilation of MIR values, Dr. Carter estimates the reactivities of four types of mineral spirits to range in reactivity from 0.97-1.49 grams ozone per gram VOC (Carter, 1999a). This means that for the types of mineral spirits tested, every gram emitted will have the potential to lead to formation of at least one gram of ozone. It should be further noted that U.S. EPA currently uses the reactivity of ethane as a "bright line" to determine whether a VOC is negligibly reactive in the atmosphere (Dimitriades, 1999). Using the MIR scale as a basis, the reactivity of ethane is 0.35 grams ozone per gram of VOC emitted (Carter, 1999a). Hence, mineral spirits are at least three to four times more reactive than ethane. It is also well known that some mineral spirits contain aromatic compounds. As such, a hydrocarbon solvent with a 30 percent aromatic content could be as much as eight to nine times more reactive than ethane. This indicates that mineral spirits are sufficiently reactive to participate in ozone formation, and hence, contribute to the excess ozone levels in the ambient air.

TABLE IV-5
OZONE DATA SUMMARIES (1980-1998)
SOUTH COAST AIR BASIN

Year	Number of Days Standard Exceeded			Ozone Concentrations in ppm				
				1 Hour			8 Hour	
	State 1 Hour	Federal 1 Hour	Federal 8 Hour	Max 1 Hour	3 Year 4th High*	EPDC*	Max 8 Hour	3 Year Avg. 4th High*
1998	107	60	92	0.24	0.22	0.224	0.206	0.154
1997	144	64	118	0.21	0.22	0.229	0.148	0.148
1996	141	85	115	0.24	0.23		0.173	0.161
1995	153	98	120	0.26	0.25	0.249	0.203	0.165
1994	165	118	148	0.30	0.28	0.279	0.208	0.171
1993	185	124	161	0.28	0.30	0.297	0.195	0.177
1992	190	142	173	0.30	0.30	0.286	0.218	0.180
1991	184	130	160	0.32	0.31	0.304	0.203	0.182
1990	185	131	161	0.33	0.33	0.310	0.193	0.186
1989	211	157	181	0.34	0.33	0.320	0.252	0.192
1988	216	178	194	0.35	0.34	0.319	0.258	0.205
1987	196	160	178	0.33	0.35	0.344	0.210	0.217
1986	217	167	191	0.35	0.35	0.360	0.251	0.222
1985	207	158	181	0.39	0.36	0.375	0.288	0.266
1984	209	175	190	0.34	0.36	0.354	0.248	0.225
1983	192	153	169	0.39	0.36	0.365	0.258	0.229
1982	198	151	166	0.40	0.39		0.265	0.233
1981	233	187	199	0.39	0.42	0.401	0.282	0.251
1980	210	167	179	0.49	0.43	0.451	0.336	0.273

* The 3 year 4th high, 3 year average 4th high, and Expected Peak Day Concentration (EPDC) are calculated based on data for 3 successive years, listed by the last year of the three year period. The EPDC represents the ozone concentration expected to occur once per year.

Source: http://www.arb.ca.gov/aqd/ozone/a1bsc.htm

d. Negative Reactivity

Industry has suggested that under certain conditions, reducing VOC emissions may actually lead to ozone nonattainment because of the concept of “negative reactivity” (Kessler, 1999). Industry has also suggested that a “NO_x” only control strategy should be implemented for ozone control.

Before addressing these issues, a short discussion of ozone chemistry and the role of NO_x and VOC in its formation is necessary.

i. Chemistry of Ozone Formation and Reactivity

In situ tropospheric chemical generation of ozone involves complex interactions among hydrocarbons and oxides of nitrogen (NO_x) (Carter, 1994; Silman *et al.*, 1995; Bergin *et al.*, 1998b; NRC, 1991; 1999). In the ambient air, the primary process leading to ozone formation is the photolysis of nitrogen dioxide (NO_2).

$$NO_2 + h\nu \rightarrow NO + O(^3P)$$

$$O(^3P) + O_2 + M \rightarrow O_3 + M$$

where M = third body such as N_2
where $O(^3P)$ = ground state oxygen atom
At photo-equilibrium, the steady state ozone concentration is then given by

$$[O_3]_{steady} = \frac{k_{photo}[NO_2]}{k_1[NO]} \qquad (\text{I})$$

where k_{photo} and k_1 are the photolysis rate of NO_2 and the rate constant for the reaction of NO with O_3, respectively. It is apparent from the equation (I) that additional processes converting NO to NO_2 can lead to enhanced ozone levels. VOCs are chemicals known to play an important role in such processes (NRC, 1991). The ability of a VOC to induce ozone formation is known as "reactivity." Under the ambient atmospheric conditions, the major loss process of volatile organic compounds (VOCs) can be summarized as follows:

$$VOC + OH \rightarrow RO_2 + \text{products}$$

$$RO_2 + \alpha NO \rightarrow \beta NO_2 + \text{radicals}$$

$$\text{Radicals} \rightarrow \delta OH + \text{products } (\textit{e.g.}, HCHO)$$

The reaction is initiated by hydroxyl (OH) radicals reacting to form peroxy radicals (RO_2). In the presence of sufficient amounts of NO_x (*i.e.*, NO and NO_2), reactions of peroxy radicals with NO compete effectively with their reactions with other peroxy radicals. This, in turn, leads to NO-to-NO_2 conversions and ultimately results in regeneration of the OH radicals. Therefore, a VOC can enhance the rate of ozone formation via an increase in the amount of NO_2 (β) converted from NO. In addition, the reaction with OH radicals is the major (or in most cases the only) loss process of most VOCs. Therefore, any enhanced production of OH radicals ($\delta > 1$) [either by the parent VOC or its products, for example, formaldehyde; (HCHO)] would increase not only its own rate of ozone formation but also increase the rate of ozone formation of other VOCs present.

However, if a radical termination process is present in the VOC's reactions, it will lead to lesser amounts of other VOCs reacting. This affects the total amount of O_3 formed (Carter, 1994; Bergin *et al.*, 1998b). Furthermore, processes like organic nitrate formation (for example, peroxyacetyl nitrate (PAN) from acetaldehyde) can affect the ability of a VOC to form ozone by reducing the amount of NO available (α) to form NO_2 (see, for example, Atkinson, 1994). Hence, the impact of a VOC on ozone formation is a function of: 1) its reaction rates (*i.e.*, kinetics); 2) direct mechanistic effects such as the amount of NO-to-NO_2 conversion; 3) indirect mechanistic effects on other VOCs via processes such as radical initiation; and, 4) the presence of other species in an urban airshed with which the VOCs potentially react. Consequently, there is a wide variation in the ability of VOCs to induce ozone formation (see, for example, Carter, 1994), and the relative importance of these processes determine whether a VOC has an enhancing (*i.e.*, positive reactivity) or a suppressing effect (*i.e.*, negative reactivity) on ozone formation.

ii. Control of NO_x Alone in Ozone Control Strategies

As described previously, the rate of ozone production is dependent on the specific VOCs present and the NO_x and VOC concentrations (Russell *et al.*, 1995). Nevertheless, NO_x and VOC emission reduction requirements needed to achieve the ambient air quality standard for ozone can be represented by an Empirical Kinetics Modeling Approach (EKMA) diagram (see, for example, Milford *et al.*, 1989). In an EKMA diagram, sensitivity of ozone formation is divided into a VOC-limited, a NO_x-limited, and transitional regimes. These regimes correspond to conditions under which ozone formation is most effectively reduced by decreasing emissions of VOCs, NO_x, or both respectively.

The chemistry which results in VOC-limited and NO_x-limited regions has been described in the literature (Bergin *et al.*, 1998b; NRC, 1999). Briefly, hydroperoxy (HO_2), peroxy (RO_2), and hydroxyl (OH) radicals play an important role in sustaining the ozone-generating cycle fueled by VOCs and NO_x. When the ambient VOC-to-NO_x ratio increases from low to high, there is a change in the relative importance of the termination steps for these radicals [*i.e.*, reaction (1) - (3)]. It is the fate of the OH, HO_2, and RO_2 radicals which determine whether an urban airshed is VOC- or NO_x-limited.

$$HO_2 + HO_2 + M \rightarrow H_2O_2 + O_2 + M \qquad (1)$$

$$RO_2 + HO_2 \rightarrow ROOH + O_2 \qquad (2)$$

$$OH + NO_2 + M \rightarrow HNO_3 + M \qquad (3)$$

Because of the ozone-NO_x-VOC sensitivity and the dynamic chemical characteristics of an air parcel (see, for example, Lu and Turco, 1996), both VOC- and NO_x-limited regions exist in an airshed. Hence, VOC- or NO_x-alone control strategies may not be as effective as a combined VOC-NO_x reduction strategy for reducing the formation of ozone. In fact, a combined strategy has been implemented by both federal and state agencies. For example, in California's Cleaner Burning Gasoline and Low Emission Vehicle (LEV) programs, both VOC and NO_x emission reductions are required. In 1995, total NO_x and VOC emissions had been reduced by 10 percent and 40 percent, respectively, compared to 1980 (Fiore *et al.*, 1998).

However, in the largest metropolitan areas, such as Los Angeles and New York City, studies on ground level ozone trend data, obtained from the period of 1980-1995 have shown that VOC emission control is more important than NO_x control in reducing ozone formation (Trainer *et al.*, 1987; Milford *et al.*, 1989; McKeen *et al.*, 1991; Roselle *et al.*, 1991; Jacob *et al.*, 1993; Fiore *et al.*, 1998). This conclusion is consistent with the observed low VOC-to-NO_x ratios (*i.e.*, VOC-limited region) (Wolff and Korsog, 1992) in Los Angeles based on the 1996-1997 VOC and NO_x data obtained from the Photochemical Assessment Monitoring Stations (PAMS) of the ARB (Woodhouse, 1999). Despite the stringent regulations implemented in the South Coast Air Basin, the low VOC-to-NO_x ratios observed (ranging from 1.6 to 9.5) suggest that summertime ozone production in the Los Angeles area is still VOC-limited. In addition, the 1996-1997 PAMS data indicated that low VOC/NO_x ratios were also observed throughout California (San Diego, Fresno, and Sacramento) (Woodhouse, 1999). There is no indication that ozone reduction would be more effective via the implementation of a NO_x-alone control strategy in these areas. Hence, VOC control is, and will continue to be, an important tool in improving California's air quality, especially in the large metropolitan areas such as Los Angeles.

iii. VOC Reduction Will Not Lead to Ozone Non-Attainment due to Negative Reactivity

As described above, a combined strategy of VOC and NO_x control has been, and continues to be California's plan to attain the NAAQS for ozone. However, some industry representatives have asserted that, under certain conditions, controlling VOCs may actually lead to ozone nonattainment due to the concept of "negative reactivity."

"Negative reactivity" is a phenomenon that occurs when, under certain conditions, VOCs have a suppressing effect on ozone formation. Such a phenomenon is observed for a subset of VOCs in a system characterized by low NO_x concentrations. Although this can be observed in laboratory settings, the low NO_x conditions conducive to the suppressing effect of these VOCs are not commonly experienced in ozone non-attainment urban areas. This is because most non-attainment episodes, such as in the South Coast Air Basin, are characterized by high concentrations of NO_x and low VOC/NO_x ratios.

As mentioned earlier, a subset of VOCs is capable of exhibiting "negative reactivity." These include VOCs that affect ozone formation via direct or indirect processes to reduce the availability of NO_x, or inhibit radical initiation, respectively. Examples include n-octane and toluene, which react predominately to form organic nitrates. This process reduces the availability of NO for NO-to-NO_2 conversions; thus, suppressing ozone formation. However, the conditions under which such phenomena occur are characterized by low NO_x concentrations and high VOC/NO_x ratios. Industry reasons that a net ozone-producing effect results when these VOCs are removed. However, traditional mass-based VOC controls do not selectively remove VOCs exhibiting ozone-suppressing effects. Thus, the industry claim that control of VOCs leads to more ozone due to negative reactivity is not substantiated in the real world. In fact, studies have been conducted which suggest that mass-based control of VOCs and NO_x result in long-term downward trends in ground level ozone in urban areas (Fiore *et al.*, 1998).

Furthermore, in high VOC/NO_x areas, the Empirical Kinetic Modeling Approach (EKMA) model predicts that reduction of VOCs has no effective impact on the ambient ozone level. This is consistent with the observation that ozone-suppressing capability of a VOC changes with the environmental conditions, and different VOCs exhibit different trends in negative reactivity. For example, both n-pentadecane and toluene are capable of suppressing ozone formation in the high VOC/NO_x environment (Dunn-Edwards, 1998). With decreasing NO_x concentrations (at a given VOC/NO_x ratio), toluene shows a decrease in its ozone-suppressing capability; however, the reverse is true for n-pentadecane, where it shows an increase in its ozone-suppressing capability (Dunn-Edwards, 1998). Hence, removal of negatively reacting VOCs from the ambient mixture may have no net impact on the ozone level, and the relatively stable reactivity trend of the base reactive organic gas (ROG) mixture at low NO_x conditions is very likely the result of such conteracting effects.

To reiterate, industry's statement that VOC control causes more ozone has not been substantiated under real world atmospheric conditions. Moreover, the atmospheric conditions (characterized by very high VOC-to-NO_x ratios) that must exist in order for VOC control to exhibit an enhancing effect on ozone formation are not likely to occur in urban centers. A study by Fiore *et al.* has suggested that decreasing levels of ozone concentrations in urban areas are due largely in part to mass-based controls of VOC and NO_x emissions (Fiore *et al.*, 1998). Therefore, a prudent ozone control strategy, such as ARB's dual control program of VOCs and NO_x, will continue to be necessary. Moreover, modeling simulations show that reducing VOCs will result in reductions in predicted ozone concentrations (Milford *et al.*, 1989).

CONCLUSION: Our analysis of the available data indicates that there is no validity to the claim that water-borne coatings are more reactive than solvent-borne coatings. To the contrary, the ARB staff's analysis indicates that solvent-borne coatings are over two times more reactive than water-borne coatings. Thus, reformulation to water-borne coatings is likely to lead to a decrease in the ozone formed from emissions of architectural coatings. Given that one of the major constituents used in solvent-borne coatings is "mineral spirits," this same analysis supports the ARB's conclusion that "mineral spirits" are sufficiently reactive to lead to the formation of ozone once emitted.

ARB staff also concludes that, contrary to industry claims, mass-based VOC regulations have been effective at reducing ground level ozone concentrations. To support this conclusion, data collected from the South Coast Air Basin show that the number of days that the federal one-hour ozone standard was exceeded has been reduced by almost 65 percent between the years 1980 and 1998. These reductions in ozone exceedances can only be attributed to effective mass-based VOC controls.

Finally, we agree with industry that, under certain atmospheric conditions produced in a laboratory setting (high VOC/NOx ratios), some selected VOCs may exhibit "negative reactivity." However, there are no data to support that these conditions are typically found in "real world" urban atmospheres (characterized by lower VOC/NOx ratios), or that VOC control has led to increases in ozone formation. As outlined above, ample data support the conclusion that reducing VOCs results in reductions in predicted ozone concentrations.

ix. Synergistic Effects of the Eight Issues

Industry representatives have stated that the synergistic effect of all of the eight issues discussed above should be analyzed. ARB staff analysis of NTS data and review of product data sheets concludes that, because low-VOC coatings perform comparably to higher-VOC coatings, none of the eight issues is expected to result in adverse air quality impacts. Therefore, since individually each issue does not result in a significant adverse air quality impact, the synergistic effect of all eight issues will not result in significant adverse air quality impacts.

b. Low Vapor Pressure

PROJECT-SPECIFIC IMPACT: Some coatings manufacturers have asserted that certain coatings solvents should not be regulated as VOCs. Industry representatives make this assertion on the premise that replacement solvents are less volatile than conventional solvents. In particular, industry representatives argue that some solvents currently used in consumer products and architectural coatings are considered low volatility compounds, meaning that they have a vapor pressure of less than 0.1 mm of Hg at 20^o Celsius.

ANALYSIS: In alleging that the ARB should exempt low vapor pressure VOCs (LVP-VOCs), industry is not claiming that adverse environmental impacts would occur (*i.e.*, that air quality would worsen) if we did not include such an exemption in the SCM. Industry is instead claiming that it does not make sense for the ARB to regulate LVP-VOCs, because supposedly LVP-VOCs do not evaporate. The analysis of this issue is discussed at length in Chapter V of this ~~Draft~~ Final Program EIR.

CONCLUSION: ARB staff believes that LVP-VOCs should not be exempted as VOCs for the reasons discussed in Chapter V. However, assuming industry is correct in its assertion that LVP-VOCs do not evaporate and therefore do not contribute to ozone formation, then regulating them as VOCs would either have neutral impacts, or would help reduce ozone. This is because the SCM may encourage a shift to water-borne coatings, which generally use more LVP-VOC solvents than solvent-borne coatings. Replacement of solvent-borne coatings with water-borne coatings would result in fewer emissions. ARB staff therefore concludes that this issue does not need to be analyzed as a potential adverse environmental impact.

c. Odor

PROJECT-SPECIFIC IMPACT: It is likely that reformulated low-VOC coatings will contain exempt solvents, as well as less hazardous and less toxic coalescing solvents. Although some of these replacement solvents have strong odors, their conventional solvent counterparts also have strong odors.

ANALYSIS: Individuals can differ quite markedly from the population average in their sensitivity to odor, due to a variety of innate, chronic, or acute physiological conditions. This includes olfactory adaptation or smell fatigue, in which continuing exposure to an odor results in a gradual diminution or even disappearance of the smell sensation. Table IV-6 lists the odor thresholds for some conventional coating solvents as well as their potential replacement solvents.

This information was obtained from the MSDS for each coating solvent. Table IV-6 illustrates the fact that odor thresholds of many replacement solvents are the same or higher than those of conventional solvents. It is expected that replacement solvents will be used to meet the recommended SCM VOC content limits.

Currently available low-VOC flat and nonflat coatings have few or no odors. They are preferred for use in settings such as hospitals, day care centers, and convalescent homes. Further, because the volume of coalescing solvents in water-based products is typically less than five percent, odor impacts are not expected from their use. Other affected coatings categories reformulated with replacement solvents are not expected to create odor impacts because, as shown in Table IV-6, the odor thresholds for many of these solvents are the same or higher than those of most conventional solvents.

TABLE IV-6
COMPARISON OF ODOR THRESHOLDS FOR CONVENTIONAL AND REPLACEMENT COATING SOLVENTS

Solvent	Threshold (PPM[1])
Conventional Solvents	
Toluene	2.9
Xylenes	0.081-40
MEK	5.4
Stoddard Solvent	1-30
Ethyl Alcohol	84
Methyl Alcohol	100
EGBE	0.1
EGEE	2.7
EGME	2.3
Replacement Solvents	
Acetone	63
Texanol	None Provided by Mfr.
Propylene Glycol	Odorless[2]
Ethylene Glycol	Odorless[2]
Oxsol 100 (PCBTF)	0.1[3]
Diisocyanates	
TDI	0.17
HDI	Odorless[2]
MDI	Odorless[2]

Sources: [1] New Jersey Department of Health, http://www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm#T
[2] MallincKrodt Baker, Inc., http://www.jtbaker.com/msds/
[3] OxyChem Specialty Business Group
[4] OSHA, http://www.osha-slc.gov/ChemSamp_data/

CONCLUSION: Odor impacts from implementation of the SCM are not expected to differ from those due to conventional solvents used in currently available coatings.

OVERALL CONCLUSION: Based on the preceding analysis of potential air quality impacts from implementing the SCM, it is concluded that the SCM will result in statewide VOC emission reductions of approximately ~~14~~ 10 tons per day (excluding the SCAQMD) by the year 2004.

PROJECT SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Because the SCM will result in an overall, long-term air quality benefit (VOC reductions), no adverse impacts remain.

CUMULATIVE IMPACTS: As shown above, analysis of project-specific air quality impacts indicates that implementation of the SCM is not expected to generate any significant adverse project-specific air quality impacts. Since the SCM is a regulatory project that affects districts as well as coatings formulators, painting contractors, and do-it-yourselfers statewide, the project-specific air quality impacts associated with the SCM are the same as its cumulative air quality impacts. Therefore, because the SCM will not result in any adverse project-specific air quality impacts, the SCM will not have any cumulative adverse air quality impacts[3].

In fact, ARB staff has determined that implementing the SCM for architectural coatings will produce substantial net air quality benefits throughout California. Implementation of the SCM will reduce VOC emissions, which in turn will tend to further reduce ambient ozone concentrations on a statewide basis.

CUMULATIVE IMPACT MITIGATION: No cumulative impact mitigation measures are required.

2. Water

In the NOP/IS, staff identified potential water demand and water quality impacts that could occur as a result of implementing the SCM. Specifically, staff determined that implementing the SCM may result in additional water demand from the manufacturing and clean-up of compliant water-borne coatings as well as additional generation of wastewater that could be disposed of into storm drains and sanitary sewers.

Significance Criteria

The project will be considered to have significant adverse water demand impacts if any one of the following criteria is met by the project in any district:

- The project increases demand for water by more than 5,000,000 gallons per day.
- The project requires construction of new water conveyance infrastructure.

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[3] The significance criteria for cumulative impacts are the same as the significance criteria for project-specific impacts.

The project will be considered to have significant adverse water quality impacts if any one of the following criteria is met by the project in any district:

- The project creates a substantial increase in mass inflow of effluents to public wastewater treatment facilities.
- The project results in a substantial degradation of surface water or groundwater quality.
- The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.
- The project results in alterations to the course or flow of floodwaters.

a. Water Demand

PROJECT SPECIFIC IMPACTS: If compliant coatings are reformulated with water, there could be increased demands for water use in the manufacturing and cleanup of water-borne coatings. Comments received on the NOP/IS and at public meetings indicated that the potential depletion of groundwater supplies and lowering of the water table from both the manufacture and the need for more surface preparation (power washing) should be analyzed.

ANALYSIS: To analyze these impacts, ARB staff projected the potential increased water demand as a result of using water to manufacture and clean up water-borne coatings. As a worst-case scenario, ARB staff assumed that all solvent-borne coatings affected by the SCM would be reformulated with water, and did not account for any use of exempt solvents such as acetone. ARB staff also assumed for this worst-case analysis that all coatings sold for use in California were manufactured in California and apportioned the manufacturing water demand according to population. (This greatly overestimates the manufacturing water demand for the majority of California, and underestimates demand for the SCAQMD, since many California coatings manufacturers are located in the South Coast Air Basin. However, the SCAQMD conducted a separate analysis for their area of jurisdiction and found negligible water demand impacts (SCQAMD, 1999)). ARB staff also used drought-year projections of water demand, which are lower than average-year demand projections in most regions of California, making the increase due to the SCM a larger percentage of the total water demand. The Department of Water Resources projections of total water demand also assumed that no new projects would be undertaken to increase or more efficiently use existing water supply. As shown in Table IV-7, water demand impacts associated with the manufacture and cleanup of reformulated water-borne coatings are anticipated to create a negligible incremental water demand and do not exceed the significance threshold of 5,000,000 gallons per day in any hydrologic region of California (hydrologic regions are much larger than districts, roughly corresponding to air basins in size, and it is therefore expected that increased water demand in any district would be considerably lower).

Regarding the need for additional surface preparation (power washing), as mentioned above in the Air Quality section, manufacturers' recommendations are the same for conventional and low-VOC coatings (*i.e.*, apply to clean, dry surfaces). It is not expected that these recommendations would change if additional coatings were to be reformulated as a result of the SCM.

CONCLUSION: As shown in Table IV-7, implementation of the SCM is expected, even as a worst-case scenario, to create a negligible increased demand for water of approximately

100,000 gallons per day statewide. While there are projected drought-year shortages in some regions of California, these shortages would occur regardless of the SCM. Therefore, no significant water demand impacts, including the lowering of water tables or the depletion of groundwater, are expected as a result of implementing the SCM.

It should be noted, however, that water providers throughout California are currently exploring various strategies for increasing water supplies and maximizing the use of existing supplies. Options include storage of water from existing sources, use or storage of water unused by other states or agricultural agencies, and advance delivery of water to irrigation districts. These continuing and future water management programs will help to assure that California's full-service water demands will be met at all times.

PROJECT-SPECIFIC MITIGATION: None required.

REMAINING IMPACTS: None.

CUMULATIVE IMPACTS: Cumulative water demand impacts from implementing the SCM are not considered to be cumulatively considerable as defined by CEQA Guidelines §15065(c) for the following reason. Although implementing the SCM is expected to incrementally increase water demand to formulate compliant coatings, this increased demand does not generate a significant adverse water demand impact, because it does not exceed any water resources threshold of significance.

Based upon the above consideration, there may be incremental, but not significant, water demand impacts. These incremental effects are not considered to be cumulatively considerable. This conclusion is consistent with CEQA Guidelines §15130(a), which states in part, "Where a lead agency is examining a project with an incremental effect that is not 'cumulatively considerable,' a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable."

CUMULATIVE IMPACT MITIGATION: None required.

b. Water Quality

i. Groundwater and Surface Water Impacts

PROJECT-SPECIFIC IMPACT: Some industry members have contended that increased use of water-borne technologies to meet the VOC content limits will result in an increase in improper disposal of the waste generated from these coatings onto the ground or into storm drains. Comments received on the NOP/IS indicated that there could be water quality impacts if low-VOC coatings are required for the water and sewage system infrastructures, and that water quality impacts could also result from the release of hazardous materials due to the failure of tank lining and pipe coatings.

Table IV-7
Projected Water Demand for Reformulated Coatings

Region	1996 Population[a] (thousands)	2010 Population[a] (thousands)	1996 Water Demand[b] (bgy)	2010 Water Demand[b] (bgy)	1996 Coating Sales[c] (mgy)	2010 Coating Sales[c] (mgy)	2010 Mfg. Demand[d] (mgy)	2010 Clean-up Demand[e] (mgy)	2010 Total Demand[f] (mgy)	% Increase in Water Demand [g]	Total Impacts[h] (gal/day)
North Coast	615	743	3,478	3,488	0.31	0.36	0.36	0.36	0.71	2.05E-05	1,957
San Francisco Bay	5,830	6,527	1,878	1,880	2.81	3.14	3.14	3.14	6.28	3.34E-04	17,196
Central Coast	1,371	1,706	525	527	0.66	0.82	0.82	0.82	1.64	3.11E-04	4,494
South Coast	17,580	21,516	1,733	1,880	8.46	10.34	10.34	10.34	20.69	1.10E-03	56,684
Sacramento River	2,376	2,430	4,601	4,633	1.15	1.19	1.19	1.19	2.37	5.12E-05	6,493
San Joaquin River	1,649	2,452	3,171	3,148	0.79	1.18	1.18	1.18	2.36	7.49E-05	6,460
Tulare Lake	1,800	2,673	3,756	3,738	0.86	1.29	1.29	1.29	2.57	6.88E-05	7,042
North Lahontan	86	109	287	291	0.04	0.05	0.05	0.05	0.10	3.60E-05	287
South Lahontan	765	1,497	215	261	0.36	0.72	0.72	0.72	1.44	5.51E-04	3,944
Colorado River	556	871	1,486	1,408	0.26	0.42	0.42	0.42	0.84	5.95E-05	2,295
California Total	32,628	40,524	21,130	21,255	15.69	19.48	19.48	19.48	38.96	1.83E-04	106,751

[a] Population projections obtained from California Department of Finance, as cited by Department of Water Resources.

[b] Water demand projections obtained from Department of Water Resources.

[c] Solvent-borne sales only. The 1998 ARB Survey sales data is used as the baseline for 1996. Total sales are apportioned by population data obtained from the Department of Finance for each region. It is assumed that coating sales will increase directly with population

[d] Assumes that one gallon of water will be used to manufacture one gallon of coating applied. Also assumes as a “worst-case” scenario, that all coatings used in California were manufactured in California, and that manufacture of coatings is distributed throughout California according to population.

[e] Assumes that one gallon of water will be used to clean up equipment for every gallon of coating applied.

[f] Total manufacture and clean-up water demand.

[g] The percentage increase in water demand as a result of the incremental increase due to manufacture and clean-up of water-borne coatings.

[h] The incremental increase in daily water usage associated with implementation of the SCM

Acronyms: bgy = billion gallons per year; mgy = millions of gallons per year

ANALYSIS: Regarding improper disposal, during its 1996 Rule 1113 amendments, SCAQMD staff conducted over 60 unannounced site visits at industrial parks and new housing construction sites in an effort to evaluate coating and clean-up practices. During these site visits, SCAQMD staff surveyed contractors regarding their clean-up practices. Out of 32 responses received from the contractors, seven (22 percent) indicated that they dumped their waste material onto the ground, 18 (56 percent) indicated that they used a disposal company to handle waste material, and seven (22 percent) indicated that they recycled their waste material as thinner. This survey demonstrates that a majority of the contractors either dispose of the waste material properly as required by the coatings manufacturer's MSDSs or recycle the waste material, regardless of the type of coating. Based upon these results, there is no reason to expect that painting contractors, especially those that dispose of wastes properly, will change their disposal practices as a result of implementing the SCM.

Furthermore, the National Paint and Coatings Association's "Protocol for Management of Post Consumer Paint" and the SCAQMD's "Painter's Guide to Clean Air," as well as other publications, provide the public and painting contractors with information as to environmentally sound coatings disposal practices. These public outreach programs are expected to reduce the amount of coatings waste material entering the sewer and storm drain systems and being dumped on the ground, thereby further reducing any water quality impacts associated with the improper disposal of compliant coatings.

Even if it is assumed that those who currently recycle their waste coatings will instead dump them illegally, significant adverse surface and/or groundwater impacts are not anticipated from implementing the SCM. Based upon staff research of currently available compliant coatings, it is likely that resin manufacturers and coatings formulators, in complying with the SCM VOC content limits, will replace conventional coatings formulations, which may contain toluene, xylenes, mineral spirits, and methyl ethyl ketone (MEK), with either exempt solvents (*e.g.*, acetone~~,~~ or Oxsol 100~~, and t-butyl acetate – if formally delisted as a VOC~~) or water-borne formulations.

In addition to the above-mentioned solvents, coalescing solvents such as Texanol and propylene glycol may be used more widely in low-VOC, water-borne formulations as alternatives to more toxic coalescing solvents such as ethylene glycol monobutyl ether (EGBE), ethylene glycol monoethyl ether (EGEE), ethylene glycol monomethyl ether (EGME), and their acetates.

Additionally, a report prepared for ARB indicates that a majority of current water-borne formulations (flats and nonflats) contain nonhazardous solvents (Censullo, 1996). The Censullo report, which is intended to upgrade the species profiles for a number of sources within the general categories of industrial and architectural coatings operations, reported that the four most common solvents in the 52 randomly chosen water-borne coatings (flats and nonflats) were: Texanol (found in 37/52); propylene glycol (31/52); diethylene glycol butyl ether (23/52); and ethylene glycol (14/52). It thus appears that the use of solvents such as Texanol and propylene glycol in water-borne coatings formulations is prevalent today and should continue into the future, with the eventual replacement of more toxic and hazardous coalescing solvents such as EGBEs with less toxic or nontoxic coalescing solvents.

ARB and SCAQMD staff research also reveals that low-VOC, two-component IM coating systems containing diisocyanate compounds such as toluene diisocyanate (TDI), hexamethylene diisocyanate (HDI), and methylene bisphenyl diisocyanate (MDI) may be used to meet the SCM's VOC content limits. Water-borne two-component systems may replace solvent-borne, one-component and two-component IM systems. However, users of these coating systems would be painting contractors that are more sophisticated and experienced than the average consumer in the proper disposal methods and applicable disposal requirements. Furthermore, after these coatings are mixed and exceed their pot life, they become a solid mass and are disposable as solid waste rather than wastewater. Thus, it is unlikely that these painting contractors will improperly dispose of these compliant coating systems and cause water quality impacts. See the Solid Waste/Hazardous Waste section below for a discussion of California law regarding the disposal of wastewater containing latex materials.

As shown in Table IV-8, replacement solvents have ecological effects that are comparable to conventional solvents. Therefore, the use of replacement solvents in compliant low-VOC reformulations will not create incrementally significant adverse groundwater or surface water impacts over and above the existing effects associated with the use of conventional solvents.

Regarding the concern about water quality impacts from the failure of tank and pipe coatings, results of the NTS study and the staff's review of product data sheets reveal that there are currently available IM coatings that comply with the proposed VOC content limits and which have coating and durability characteristics comparable to existing high-VOC coatings. Thus, water quality impacts from the alleged failure of pipe and tank lining coatings is not expected to occur.

<u>CONCLUSION</u>: Disposal practices are not expected to change as a result of implementing the SCM. Even if some users improperly disposed of their leftover paint, significant groundwater and surface water quality impacts are not expected from the use of Texanol, propylene glycol, and ethylene glycol as replacement solvents in compliant water-borne coatings. Furthermore, the potential for significant impacts to groundwater and surface water from the use of compliant IM coatings containing diisocyanates is unlikely, since these coatings would be disposed of as solid waste materials. It is expected that users will properly dispose of any waste generated from application of these coatings. Lastly, water quality impacts are not expected to occur as a result of tank lining and pipe coating failures because durability characteristics are similar for low-VOC and conventional coatings.

ii. Impacts to Publicly Owned Treatment Works (POTWs)

<u>PROJECT-SPECIFIC IMPACT</u>: As already noted, it is anticipated that some future compliant coatings will be formulated with water-borne technologies. As a result, more water will be used for clean-up, and the resultant wastewater material would be disposed of into public sewer systems. Thus, the increased usage of water-borne compliant coatings could adversely affect the ability of local POTWs to handle the projected incremental increase in waste material. Comments were received on the NOP/IS stating that the environmental effects of increased wastewater generation and the need for new or expanded wastewater treatment facilities should be evaluated.

TABLE IV-8
ECOLOGICAL INFORMATION FOR COATINGS SOLVENTS

Characteristic	**CONVENTIONAL SOLVENTS**								
	Toluene	Xylenes	MEK	Stoddard solvent	Ethyl alcohol	Methyl alcohol	EGBE	EGEE	EGME
Solubility in Water (@ 20 ^{o}C)	500 ppm	130 ppm	27%	Insoluble	100%	100%	Miscible	Miscible	Miscible
Vapor Pressure (@ 20 ^{o}C)	22 mmHg	6 mmHg	85 mmHg	1.1 mmHg	44 mmHg	96 mmHg	0.6 mmHg	3.8 mmHg	6.2 mmHg
Environmental Fate (Released into the Water)				Not Available	Not Available				
Evaporation	Moderately	Moderately	Moderately				Slightly	Slightly	
Biodegradable			Moderately			Significantly	Moderately	Moderately	Moderately
Bioaccumulation			Moderately			Moderately	Slightly	Slightly	Slightly
Environmental Fate (Released into the Soil)				Not Available	Not Available				
Evaporation	Moderately	Moderately				Significantly	Significantly	Moderately	Moderately
Biodegradable	Moderately	Moderately				Significantly	Moderately	Moderately	
Groundwater Leaching	Expected	Expected	Expected			Expected	Expected	Expected	Expected
Environmental Toxicity	Toxic to Aquatic Life	Toxic to Aquatic Life	Not Toxic to Aquatic Life	Not Available	Not Available	Slightly Toxic to Aquatic Life	Not Toxic to Aquatic Life	Not Toxic to Aquatic Life	Not Toxic to Aquatic Life
LC50/96 Hour Value for Fish	10 –100 mg/l	10 –100 mg/l	>100 mg/l	Not Available	Not Available	Not Available	>100 mg/l	>100 mg/l	>100 mg/l
Bioconcentration Factor (eels)	13.2	1.3	Not Available	Not Available	Not Available	Not Available	<100	Not Available	Not Available

TABLE IV-8 (CONTINUED)
ECOLOGICAL INFORMATION FOR COATINGS SOLVENTS

Characteristic	REPLACEMENT SOLVENTS					
	Acetone	Texanol	Propylene glycol	Ethylene glycol	Oxsol 100	TDI
Solubility in Water (@ 20 ^{o}C)	100%	0.1%	100%	100%	29 ppm	Decomposes
Vapor Pressure (@ 20 ^{o}C)	180 mmHg	0.01 mmHg	0.07 mmHg	0.06 mmHg	5.3 mmHg	0.04 mmHg
Environmental Fate (Released into the Water)					Not Available	
Evaporation	Significantly					
Biodegradable	Significantly	Expected*	Significantly	Significantly		Slightly
Bioaccumulation	Slightly			Slightly		
Environmental Fate (Released into the Soil)		Not Available			Not Available	Not Available
Evaporation	Significantly			Slightly		
Biodegradable	Significantly		Significantly	Significantly		
Ground Water Leaching	Expected		Expected	Expected		
Environmental Toxicity	Not Toxic to Aquatic Life	Moderately Toxic to Aquatic Life*	No Information Found	Not Toxic to Aquatic Life	Not Available	Not Available
LC50/96 Hour Value for Fish	>100 mg/l	33 mg/l	Not Available	>100 mg/l	Not Available	Not Available
Bioconcentration Factor (eels)	Not Available	Not Available	Not Available	Not Available	2.3	Not Available

Source: Mallinckrodt Baker, Inc., http://www.jtbaker.com/msds/; * Eastman Chemical Co., http://www.enm.com

ANALYSIS: In evaluating the projected generation of wastewater, staff assumed that the current practice of using water to clean coating equipment (spray guns, rollers, and brushes) will continue into the future. Table IV-9 illustrates the potential increase of waste material likely to be received by POTWs in California as a result of implementing the SCM.

TABLE IV-9
PROJECTED POTW IMPACT FROM REFORMULATED COATINGS

County	1999 Average Daily Wastewater Flow (gal)	2010 Coatings Disposal (gal)[a]	2010Coatings Disposal (gal/day)[b]	Total Impacts (% increase in Wastewater Flow)
ALAMEDA	155,399,800	805,395	2,207	0.0014
ALPINE	38,000	705	2	0.0051
AMADOR	764,000	18,602	51	0.0067
BUTTE	7,051,000	125,900	345	0.0049
CALAVERAS	1,016,000	26,282	72	0.0071
COLUSA	1,410,000	15,144	41	0.0029
CONTRA COSTA	66,268,000	499,382	1,368	0.0021
DEL NORTE	1,326,000	18,137	50	0.0037
EL DORADO	4,728,000	104,736	287	0.0061
FRESNO	14,332,100	464,138	1,272	0.0089
GLENN	1,779,000	19,012	52	0.0029
HUMBOLDT	8,603,200	66,010	181	0.0021
IMPERIAL	12,207,000	107,866	296	0.0024
INYO	1,817,000	9,467	26	0.0014
KERN	41,783,000	418,555	1,147	0.0027
KINGS	6,935,000	75,267	206	0.0030
LAKE	2,831,100	37,851	104	0.0037
LASSEN	1,460,000	21,071	58	0.0040
LOS ANGELES	701,837,800	5,162,195	14,143	0.0020
MADERA	5,710,000	85,253	234	0.0041
MARIN	18,981,200	125,870	345	0.0018
MARIPOSA	126,000	10,063	28	0.0219
MENDOCINO	4,222,200	51,223	140	0.0033
MERCED	16,509,000	128,718	353	0.0021
MODOC	492,000	5,601	15	0.0031
MONO	2,266,000	6,115	17	0.0007
MONTEREY	8,149,100	233,485	640	0.0078
NAPA	1,697,000	69,876	191	0.0113
NEVADA	8,540,000	58,592	161	0.0019
ORANGE	311,314,200	1,540,110	4,219	0.0014
PLACER	8,137,000	158,524	434	0.0053
PLUMAS	1,751,000	10,837	30	0.0017
RIVERSIDE	84,049,100	1,034,701	2,835	0.0034
SACRAMENTO	272,683,000	699,177	1,916	0.0007
SAN BENITO	2,392,000	33,122	91	0.0038
SAN BERNARDINO	112,106,600	1,065,014	2,918	0.0026
SAN DIEGO	279,594,200	1,675,274	4,590	0.0016
SAN FRANCISCO	86,700,000	380,902	1,044	0.0012

TABLE IV-9 (CONTINUED)
PROJECTED POTW IMPACT FROM REFORMULATED COATINGS

SAN JOAQUIN	50,464,100	353,349	968	0.0019
SAN LUIS OBISPO	7,679,600	158,082	433	0.0056
SAN MATEO	56,000,000	396,997	1,088	0.0019
SANTA BARBARA	27,596,100	228,043	625	0.0023
SANTA CLARA	170,060,000	984,016	2,696	0.0016
SANTA CRUZ	24,630,600	150,520	412	0.0017
SHASTA	10,700,000	103,662	284	0.0027
SIERRA	275,000	1,733	5	0.0017
SISKIYOU	2,825,300	24,115	66	0.0023
SOLANO	34,938,100	233,241	639	0.0018
SONOMA	25,408,400	265,066	726	0.0029
STANISLAUS	36,491,000	285,028	781	0.0021
SUTTER	3,802,000	48,892	134	0.0035
TEHAMA	2,420,000	34,352	94	0.0039
TRINITY	266,000	7,140	20	0.0074
TULARE	30,633,600	228,555	626	0.0020
TUOLUMNE	1,970,000	33,299	91	0.0046
VENTURA	57,153,900	416,005	1,140	0.0020
YOLO	8,798,000	94,914	260	0.0030
YUBA	3,637,000	35,991	99	0.0027
CALIFORNIA TOTAL	2,812,754,300	19,409,743	53,177	0.0019

[a] Based on estimated 2010 coatings sales of current solvent-borne formulations. Assumes that one gallon of water will be used to clean up equipment for every gallon of coating applied. Also assumes that all solvent-borne coatings categories will be converted to water-borne formulations.

The staff's analysis considerably overestimates potential wastewater impacts from implementing the SCM. In the absence of projected average daily flows to the various POTWs in California, staff evaluated the impact of coatings wastewater disposal using estimated 2010 coatings sales and 1999 average daily wastewater flows. It was also assumed that one gallon of water would be used to clean up each gallon of paint. Finally, staff assumed that water-borne technology would replace all solvent-borne coatings currently sold in California, including those solvent-borne coatings that already comply with the proposed VOC content limits. Even under this worst-case scenario, coatings wastewater disposal is estimated to account for approximately 50,000 gallons per day, or only a 0.0019 percent increase in the statewide daily flow of wastewater to POTWs.

CONCLUSION: The potential increase in coatings wastewater disposal is considered to contribute a negligible amount to the average daily flow of wastewater to POTWs in California. Implementation of the SCM will therefore not result in the need for new or expanded wastewater treatment facilities. Hence, wastewater impacts associated with the disposal of water-borne clean-up waste material generated from the coatings categories affected by the SCM are not considered significant.

OVERALL CONCLUSION: Based upon the preceding analyses, implementation of the SCM is not expected to create significant adverse groundwater and surface water quality impacts for the following reasons. First, coatings manufacturers are using less hazardous or nonhazardous materials in their formulations. This trend may be the result of increasingly stringent state and federal regulations relative to hazardous materials, as well as the potential for increased liability associated with using hazardous materials. Second, experienced users are expected to properly dispose of waste generated from the use of compliant coatings. Third, public outreach programs are anticipated to further inform the public and painting contractors as to the proper disposal methods for compliant coatings. Fourth, even if waste materials were disposed of improperly, the use of replacement solvents would not incrementally increase water quality impacts above the impacts associated with the use of current conventional solvents.

Based upon projections of coatings sales and wastewater disposal, California's POTWs are expected to be able to handle any incremental increase in wastewater associated with the use of compliant water-borne coatings. As a result, no significant impacts to POTWs are expected as a result of implementing the SCM.

PROJECT-SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Because water quality impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The ARB has evaluated the SCM to determine potential significant cumulative water resources impacts. No significant additional project-specific water resources impacts are expected to result from implementing the SCM, and no significant cumulative adverse water resources impacts are anticipated.

CUMULATIVE IMPACT MITIGATION: None required.

3. Public Services

In the NOP/IS, staff identified potential significant public services impacts that could occur as a result of implementing the SCM, specifically, whether reformulated compliant coatings could lead to more demand for fire department services. Comments received on the NOP/IS also indicated that implementing the SCM could result in increased maintenance at public facilities because low-VOC coatings allegedly do not perform or hold up as well as traditional solvent-borne coatings.

Significance Criteria

The project will be considered to have significant adverse public services impacts if the following criteria are met in any district:

- The project results in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives.

a. Additional Maintenance of Public Facilities

PROJECT-SPECIFIC IMPACTS: In response to the NOP/IS, some commenters have asserted that because reformulated compliant coatings will not perform as well as current coatings, the infrastructure needs at public facilities may be impacted due to more frequent maintenance activities. Water-borne coatings would have to applied during the warmer and drier months, and consequently public facilities—especially parks—may be severely impacted and unavailable for periods of time when they otherwise would be available.

ANALYSIS: Results of the NTS study show that when compared to conventional, currently compliant coatings, low-VOC coatings have similar performance and application characteristics (see Appendix D). As discussed in the Air Quality section of this chapter, low-VOC coatings for both architectural and IM applications are durable and long lasting. Any durability problems experienced by low-VOC coatings are no different than those seen with conventional coatings. Because low-VOC coatings are as durable as conventional coatings, more frequent recoating is not necessary.

Regarding the comment that water-borne coatings must be applied during the warmer and drier months, staff's evaluation of drying times in the Air Quality section indicates that for all categories except lacquers, drying times of low-VOC coatings are similar or shorter than those of conventional coatings. Thus, there should be no reason why application of water-borne coatings should be limited to the warmer and drier months.

CONCLUSION: Based upon NTS data and the dry time and qualitative durability descriptions in the coatings product data sheets, staff concluded that low-VOC coatings have durability and dry time characteristics comparable to conventional coatings, and that therefore the SCM will not adversely impact the maintenance of public facilities.

PROJECT-SPECIFIC MITIGATION MEASURES: No mitigation measures are required.

REMAINING IMPACTS: Because public service impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The ARB has evaluated the SCM to determine potential significant cumulative public services impacts. No significant additional project-specific public services impacts at public facilities are expected to result from implementing the SCM, and no significant cumulative adverse public services impacts are anticipated.

CUMULATIVE IMPACT MITIGATION: None required.

b. Fire Protection

PROJECT-SPECIFIC IMPACTS: Potential adverse impacts to fire departments could occur in two ways: 1) if there is an increase in accidental releases of hazardous materials used in compliant coatings, or an increase in fires caused by flammable solvents, fire departments would have to respond more frequently to accidental release incidences or fires, and 2) if there is an increase in the amount of hazardous materials stored at affected facilities, fire departments would have to conduct additional inspections. If either of these situations were to occur as a result of implementation of the SCM on a statewide basis, more firefighting personnel and facilities may be required.

Comments received on the NOP/IS and at public meetings indicated that the flammability of acetone, which may be increasingly used as an exempt solvent in certain formulations, is a concern.

ANALYSIS: Table IV-10 highlights the flammability characteristics of currently used solvents compared to replacement solvents that may be used to reformulate various affected coatings categories to meet the SCM's proposed VOC content limits.

As a worst-case scenario, ARB staff assumed that most affected SCM coatings categories would be reformulated with acetone to meet the proposed VOC content limits. Considering the only coatings categories that may be reformulated with acetone are lacquers, floor coatings, and some waterproofing sealers, this assumption greatly overestimates the potential impacts to fire departments associated with the SCM.

As illustrated in Table IV-10, the flammability classifications by the National Fire Protection Association (NFPA) are the same for acetone, toluene, xylenes, MEK, ethyl alcohol, and methyl alcohol. Although acetone has the lowest flashpoint of these compounds, it still has one of the highest Lower Explosive Limits (2.6 percent by volume), which means that acetone vapors will not cause an explosion unless the vapor concentration exceeds 26,000 parts per million (ppm).

In contrast, for example, toluene vapors can cause an explosion at 13,000 ppm, which poses a much greater risk of explosion. The concentration of xylene vapors that could cause an explosion is even lower at 10,000 ppm. Under operating guidelines of working with flammable coatings under well-ventilated areas, as prescribed by the fire department codes, it would be difficult to achieve concentrations of such vapors.

Chemistry classes from grade school to universities, as well as industrial laboratories, use acetone for wiping down counter tops and cleaning glassware. Acetone is also used as a solvent for paint, varnish, lacquers, inks, adhesives, floor coatings, and cosmetic products including nail polish and nail polish remover.

Labels and MSDSs accompanying acetone-borne products caution the user regarding acetone's flammability and advise the user to keep the container away from heat, sparks, flames, and all other sources of ignition. The labels also normally warn the user that the vapors may cause flash fire or ignite explosively and to use only with adequate ventilation. These warnings on acetone-borne products are similar to the warnings found on a vast majority of coatings products.

As part of the SCAQMD's Environmental Assessment for the 1996 amendments to Rule 1113 (SCAQMD, 1996) and to address concerns raised by industry, the SCAQMD contacted four local fire departments to gain an understanding of potential impacts to fire departments associated with the use of reformulated coatings containing acetone. During these interviews, the four local fire departments indicated that they would treat all solvents that have a vapor pressure less than 65° Fahrenheit the same. As shown in Table IV-10, several conventional coatings have flashpoints below 65° Fahrenheit.

In particular, Captain Michael R. Lee, of the Petroleum-Chemical Unit for the County of Los Angeles Fire Department, submitted a letter to the SCAQMD stating that the Uniform Fire Code (UFC) treats solvents such as acetone, butyl acetate, MEK, and xylenes as Class I Flammable Liquids (SCAQMD, 1996). Further, the UFC considers all of these solvents to present the same relative degree of fire hazard. The UFC also sets the same requirements for the storage, use, and handling of all four solvents. Captain Lee also indicated that in his opinion, acetone presents the highest degree of fire hazard of the four solvents considered, but is not significantly more hazardous than the others. He recommended that all four solvents be used with extreme caution and with proper safeguards in place.

Additionally, the County of Los Angeles, Fire Department, Fire Prevention Guide #9 regulates spray application of flammable or combustible liquids (SCAQMD, 1999). The guide requires no open flame, spark-producing equipment, or exposed surfaces exceeding the ignition temperature of the material being sprayed within the area. For open spraying, as would be the case for the field application of acetone-based coatings, no spark-producing equipment or open flame shall be within 20 feet horizontally and 10 feet vertically of the spray area. Anyone not complying with the above guidelines would be in violation of current fire codes. The fire department limits residential storage of flammable liquids to five gallons and recommends storage in a cool place. If the flammable coating container will be exposed to direct sunlight or heat, storage in cool water is recommended. Lastly, all metal containers involving the transfer of five gallons or more should be grounded and bonded.

CONCLUSION: Based upon the above considerations, it is not expected that the SCM will generate significant adverse impacts to local fire departments that would require new or additional firefighting resources. Similarly, as noted below in the Hazards section, the use of replacement solvents in future compliant coatings is not expected to result in an increase in accidental releases of coatings materials. Additionally, as demonstrated in the Hazards section, future compliant coatings materials are not expected to cause significant adverse human health impacts, so accidental release scenarios would be expected to pose a lower risk to responding firefighters. Furthermore, if manufacturers continue to use solvents such as Texanol, propylene glycol, ethylene glycol, and Oxsol 100 in their compliant water-borne coatings, fire departments would not be expected to experience adverse impacts because in general these replacement solvents are less flammable solvents as rated by the NFPA.

PROJECT-SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Because public service impacts to fire departments are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The ARB staff has evaluated the SCM to determine potential significant cumulative fire protection impacts. No significant additional project-specific fire protection impacts are expected to result from implementing the SCM, and no significant cumulative adverse fire protection impacts are anticipated.

TABLE IV-10
CHEMICAL CHARACTERISTICS FOR COMMON COATING SOLVENTS

Conventional Solvents								
Chemical Compounds	**M.W.**	**Boiling Point (@760 mmHg, °F)**	**Evaporation Rate (@25 °C)**	**Flashpoint (°F)**	**LEL/UEL (% by Vol.)**	**Autoignition Temperature (°C)**	**Vapor Pressure (mmHg @ 20 °C)**	**Flammability Classification (NFPA)**
Toluene	92	111	2.0	41	1.2/7	538	22	3
Xylenes	106	139	0.8	81	1.0/6.6	499	6	3
MEK	72	80	4.0	25	1.8/11.5	474	8.7	3
Stoddard solvent	144	154-188	0.1	109-113	1/7	232	1.1	2
Ethyl alcohol	46	78	2.3	56	3.3/19	435	44	3
Methyl alcohol	32	64.5	4.6	54	6/36	470	96	3
Isopropyl alcohol	60	180	1.4	53	2.0/12.0	399	33	3
EGBE	118	340	0.07	144	1.1/12.7	460	0.8	2
EGEE	90	275	0.3	109	1.7/15.7	235	3.8	2
EGME	76	255	1.0	102	1.8/14	547	6.2	2

TABLE IV-10 (CONTINUED)
CHEMICAL CHARACTERISTICS FOR COMMON COATING SOLVENTS

Replacement Solvents								
Chemical Compounds	**M.W.**	**Boiling Point (@760 mmHg, ^{o}F)**	**Evaporation Rate (@25 ^{o}C)**	**Flashpoint (^{o}F)**	**LEL/UEL (% by Vol.)**	**Autoignition Temperature (^{o}C)**	**Vapor Pressure (mmHg @ 20 ^{o}C)**	**Flammability Classification (NFPA)**
Acetone	58	56	6.1	-4	2.6/12.8	538	180	3
Texanol	216	471	0.002	248	0.6/4.2	393	0.01	1
Propylene Glycol	76	187	0.01	225	2.6/12.5	415	0.07	1
Ethylene Glycol	62	197	0.01	244	3.2/15.3	412	0.06	1
Oxsol 100	181	282	0.9	109	0.9/10.5	97	5.3	1
TDI	174	482	No Info	261	0.9/9.5	620	10	1
HDI	168	491	No Info	284	0.9/9.5	454	0.05	1
MDI	250	342	No Info	396	0.9/9.5	454	0.05	1

Source: OxyChem Specialty Business Group

CUMULATIVE IMPACT MITIGATION: None required.

4. Transportation/Circulation

In the NOP/IS prepared for the SCM, potential transportation/circulation impacts were identified, specifically, that implementing the SCM may cause increased trips to landfills for disposal of additional waste materials (coatings and containers) due to problematic performance characteristics (shelf life, pot life, and freeze-thaw) of certain low-VOC coatings formulations.

Significance Criteria

The project will be considered to have significant transportation/circulation impacts if any one of the following criteria is met in any district:

- The project results in the need for 350 or more employees.
- The project will increase heavy-duty transport truck traffic to and/or from any one facility by more than 350 truck trips per day.
- The project will increase customer traffic by more than 700 trips per day.

PROJECT-SPECIFIC IMPACTS: In response to the NOP/IS, some commenters have asserted that transportation/circulation impacts will occur as a result of implementing the SCM because of the reduced freeze-thaw stability of low-VOC coatings. It is asserted that out-of-state manufacturers would have to ship these coatings during the three nonwinter seasons to avoid potential freezing en route, resulting in an increase in traffic during the high ozone periods.

In addition, some manufacturers have also asserted that low-VOC coatings require more surface preparation and have longer drying times than conventional coatings. As a result, jobs will take more than one day to complete. Other transportation/circulation issues include the assertion that low-VOC coatings contain a higher solids content, with a lower average coverage area. As a result, more transport trips would be necessary to supply the additional volumes of coatings for a given job. It is also claimed that low-VOC coatings require more touch-up and repair, which means more trips to each job site.

Some industry members have also claimed that the SCM will generate solid waste/hazardous waste impacts which in turn, will lead to increased traffic impacts due to compliant coatings having allegedly shorter pot lives, shorter shelf lives, or lesser freeze-thaw capabilities compared to existing coatings.

ANALYSIS: Regarding freeze-thaw characteristics, manufacturers have indicated that the addition of surfactants will improve the freeze-thaw capabilities of water-borne coatings. In addition, the NTS study shows that there are compliant water-borne coatings that have passed freeze-thaw stability tests (see ~~Appendix D~~ Chapter VI and Appendix E of the Staff Report). Regarding drying time, as discussed in the Air Quality section of this chapter, both the NTS study and ARB staff's evaluation of coatings product data sheets indicate that low-VOC primers, sealers, and undercoaters have comparable or shorter drying times, on average, than conventional coatings. (It is assumed that the largest concern regarding drying time would be for primers, sealers, and undercoaters, which by definition require additional topcoats.) Consequently, the assertion that low-VOC coatings have longer drying times that will require more trips over more days is not supported by the NTS study or coatings product information sheets.

Also, as discussed in the Air Quality impacts section of this chapter, manufacturers' recommendations are the same for conventional and low-VOC coatings (*i.e.*, apply to clean, dry surfaces). It is not expected that these recommendations would change to require further surface preparation if additional coatings were to be reformulated as a result of the SCM.

As further discussed in the Air Quality section, results of the NTS study, historical sales data, and staff's evaluation of product data sheets indicate that coverage area for low-VOC coatings is generally comparable to that of conventional coatings. Therefore, it is not likely that additional trips due to apply additional volumes of coatings will be necessary.

Extra touch-up and repair and more frequent coating applications are related to durability qualities of coatings. As discussed in the Air Quality section of this chapter, both the NTS study and ARB staff's evaluation of coatings product data sheets indicates that low-VOC coatings have durability characteristics comparable to conventional coatings.

Staff's worst-case evaluation of the solid waste/hazardous waste impacts associated with the use of low-VOC coatings (see below) does not indicate that there will be significant increases in the amount of material landfilled due to freeze-thaw, shelf-life, or pot-life problems. The small incremental increase (if any) would not generate the need for additional employees, or generate additional customer or heavy-duty truck traffic that would exceed the significance criteria described above.

CONCLUSION: Based upon the above considerations, no significant adverse transportation/ circulation impacts are anticipated from implementing the SCM.

PROJECT-SPECIFIC MITIGATION MEASURES: No mitigation measures are required.

CUMULATIVE IMPACTS: The ARB staff has evaluated the SCM to determine potential significant cumulative transportation/circulation impacts. No significant additional project-specific transportation/circulation impacts are expected to result from implementing the SCM, and no significant cumulative adverse transportation/circulation impacts are anticipated.

CUMULATIVE IMPACT MITIGATION: None required.

5. Solid Waste/Hazardous Waste

In the NOP/IS prepared for the SCM, ARB staff identified potential significant adverse solid waste/hazardous waste impacts associated with the implementation of the SCM, specifically, whether implementation of the SCM on a statewide basis could cause solid waste/hazardous waste impacts as described below.

Significance Criteria

The project will be considered to have significant adverse solid waste/hazardous waste impacts if the following criteria are met by the project in any district:

- The generation and disposal of nonhazardous or hazardous wastes that exceed the capacity of designated landfills.
- The project does not comply with federal, state, and local statutes and regulations related to solid waste and hazardous waste.

PROJECT-SPECIFIC IMPACTS: Comments received on the NOP/IS have alleged that implementing the SCM will generate solid waste/hazardous waste impacts for the following reasons:

- Compliant lower-VOC coatings targeted by the SCM will not have the same freeze-thaw capabilities as existing coatings, and therefore may “go bad” during transport from mild climates to extreme climates, resulting in that load being discarded into a landfill.
- Compliant lower-VOC coatings targeted by the SCM will have shorter shelf lives, and therefore a percentage of the manufacturer’s inventory will have to be landfilled because the coatings have “gone bad” in the can over time.
- As a result of the lower-VOC content limits for IM and floor coatings, manufacturers will formulate more two-component systems that may have, on average, a shorter pot life compared to conventional coatings. As a result, low-VOC coatings could solidify in the can during the application process, resulting in an unusable portion of coating that would need to be discarded into a landfill.
- Because the proposed SCM will require the use of water-borne technologies, more surface preparation in the form of sandblasting will be required. This in turn will increase the amount of wastes deposited in landfills.

ANALYSIS: ARB staff evaluation of coatings product data sheets (see the tables in Appendix E and Table IV-2) shows that all categories of low-VOC coatings except quick dry primers, sealers, and undercoaters have comparable or even longer shelf lives than conventional coatings. However, low-VOC IM and floor coatings had average pot lives that were shorter (on the order of one-half) than those of conventional coatings. As discussed above, the NTS study shows that there are compliant water-borne coatings that pass freeze-thaw stability tests. Furthermore, manufacturers have indicated that the addition of surfactants will help to overcome freeze-thaw problems.

To estimate solid waste impacts associated with implementing the SCM, staff assumed that, beginning in 2003 and 2004 (for IM coatings), five percent of all affected coatings (those that currently do not comply with the proposed VOC limits; see Table II-2) would be landfilled due to freeze-thaw problems, one percent of all affected coatings would be landfilled due to a shorter shelf life, and 10 percent of all IM and floor coatings would be landfilled as a result of having a shorter pot life (SCAQMD, 1999). According to California law, coatings that have solidified are not considered a hazardous waste and may disposed of in municipal landfills (although it is illegal for the homeowner or contractor to intentionally allow a paint to solidify for purposes of such disposal). Liquid coatings must be sent to a hazardous waste treatment facility (see below). Therefore, the ARB staff assumed that the only coatings that would solidify due to the SCM and be considered nonhazardous waste would be IM and floor coatings. However, the empty containers of failed (but still liquid) coatings due to freeze-thaw and shelf-life problems were included in the solid waste analysis.

Table IV-11 shows the estimated nonhazardous material that may be landfilled if industry's assertions are correct. Table IV-11 also shows that the landfilling of nonhazardous material associated with implementation of the SCM is insignificant, accounting for less than one percent of the permitted 1999 throughput in any county.

According to the Department of Toxic Substances Control (DTSC), latex (water-borne) paint in its virgin (pure) form is not considered a hazardous material. However, DTSC indicates that when coatings formulators add pigments, binders, biocides, etc., to virgin latex paint it becomes a hazardous material. In this form, latex paint cannot be disposed of into sewers or storm drains unless it is a constituent of wastewater generated from equipment cleaning activities. Furthermore, DTSC recommends cleaning equipment (brushes, rollers, and spray guns) used to apply latex paint with water in sinks or other facilities that flow directly to a wastewater treatment facility.

Increased sandblasting wastes are not expected as a result of implementing the SCM. As discussed in the Air Quality section of this chapter, manufacturers' recommendations do not currently specify additional surface preparation, including abrasive blasting, for water-borne coatings. As with all coatings, the surface needs to be properly prepared prior to application of a coating for optimal performance.

To estimate the amount of liquid hazardous waste that would be generated due to implementation of the SCM, it was assumed that five percent and one percent per year of all coatings affected by the SCM would be disposed due to freeze-thaw and shelf-life problems, respectively. As a worst-case scenario, it was assumed that construction of additional permitted capacity within California would not occur. It was also assumed that all coatings, including existing solvent-borne formulations, would be reformulated as waterborne coatings. As shown in Table IV-12, the increased amount of coatings that would be disposed of in hazardous waste landfills from 2003 through 2010 is not expected to significantly impact the capacity of these landfills.

It should be noted that the above analysis overestimates the actual solid waste and hazardous waste impacts associated with implementation of the SCM for several reasons. First, it is not likely that coatings manufacturers will simply dispose of all coatings damaged due to the alleged freeze-thaw and shelf-life problems. It may be possible that some of these coatings can be reused for various other purposes, such as painting over graffiti, etc. Second, discussions with manufacturers of low-VOC resin technology have indicated that the inclusion of surfactants will help eliminate freeze-thaw and shelf-life problems. Lastly, when painting contractors become familiar with appropriate application techniques required for applying low-VOC, two-component IM systems, pot-life problems will decrease significantly or be eliminated altogether since the contractors will be able to more accurately estimate the correct amount of coating to be mixed to minimize waste. It is expected that by the time the SCM VOC limits become effective, painting contractors will have learned the proper application techniques for the low-VOC, two-component IM systems. Therefore, the amount of pot-life disposal shown in Table IV-11 above should drop even further after the VOC limits become effective.

CONCLUSION: As shown in Tables IV-11 and IV-12, even if some compliant coatings are landfilled due to freeze-thaw, shelf-life, or pot-life problems, the total amount of solid waste and hazardous waste material deposited in California's landfills will not create a significant solid waste or hazardous waste impact.

PROJECT-SPECIFIC MITIGATION MEASURES: No mitigation measures are required.

CUMULATIVE IMPACTS: The ARB has evaluated the SCM to determine potential significant cumulative solid waste/hazardous waste impacts. No significant additional project-specific solid waste/hazardous waste impacts are expected to result from implementing the SCM, and no significant cumulative adverse solid waste/hazardous waste impacts are anticipated for the reasons identified above.

CUMULATIVE IMPACT MITIGATION: None required.

6. Hazards

The NOP/IS prepared for the SCM identified potential significant adverse hazards impacts associated with the proposed project, specifically, whether implementation of the SCM on a statewide basis could generate hazards impacts as described below. Hazards impacts are divided into hazards impacts and human health impacts and are analyzed separately.

a. Hazardous Materials

Significance Criteria

The project will be considered to have significant adverse hazards impacts if any one of the following criteria is met by the project in any district:

- The project results in a substantial number of people being exposed to a substance causing irritation.
- The project results in one or more people being exposed to a substance causing serious injury or death.
- The project creates substantial human exposure to a hazardous chemical.

PROJECT-SPECIFIC IMPACTS: Hazards impacts concerns are related to the risk of fire, explosions, or the release of hazardous substances in the event of an accident or upset conditions. It is expected that the VOC content limits in the proposed SCM may be achieved, in part, through the use of replacement solvents and predominantly water-borne technologies. For example, acetone, which is a flammable substance, may be used as a replacement solvent in lacquer, floor coating, and some waterproofing sealer formulations. Overall, exempt solvents such as acetone and~~,~~ Oxsol 100~~, and t-butyl acetate (if formally delisted as a VOC by the U.S.EPA),~~ are considered to be viable alternatives to other, more toxic solvents currently found in various coatings.

TABLE IV-11
ANTICIPATED SOLID WASTE IMPACTS ASSOCIATED WITH IMPLEMENTING THE SCM[a]

County	Permitted Throughput tons/day (1999)	Freeze-Thaw Disposal[b] tons/day (2010)	Shelf-Life Disposal[c] tons/day (2010)	Pot life Disposal[d] tons/day (2010)	Total Disposal tons/day (2010)	Total Impact (% of Permitted Throughput)
Alameda	16014	0.196[e]	0.033 [e]	0.384[e]	0.613[e]	0.004
Alpine	0	0.000	0.000	0.000	0.000	N/A
Amador	3	0.003	0.001	0.006	0.010	0.323
Butte	170	0.021	0.004	0.041	0.065	0.039
Calaveras	500	0.004	0.001	0.009	0.014	0.003
Colusa	1	0.002	0.000	0.005	0.008	0.790
Contra Costa	6750	0.082	0.014	0.162	0.258	0.004
Del Norte	30	0.003	0.001	0.006	0.009	0.032
El Dorado	300	0.017	0.003	0.034	0.054	0.018
Fresno	1984	0.077	0.013	0.150	0.240	0.012
Glenn	100	0.003	0.001	0.006	0.010	0.010
Humboldt	500	0.011	0.002	0.021	0.034	0.007
Imperial	1153	0.018	0.003	0.035	0.056	0.005
Inyo	109	0.002	0.000	0.003	0.005	0.005
Kern	6586	0.069	0.012	0.135	0.216	0.003
Kings	300	0.012	0.002	0.024	0.039	0.013
Lake	200	0.006	0.001	0.012	0.020	0.010
Lassen	135	0.003	0.001	0.007	0.011	0.008
Los Angeles	69382	0.852	0.144	1.671	2.666	0.004
Madera	395	0.014	0.002	0.028	0.044	0.011
Marin	2300	0.021	0.004	0.041	0.065	0.003
Mariposa	60	0.002[e]	0.000	0.003	0.005	0.009
Mendocino	203	0.008	0.001	0.017	0.026	0.013
Merced	1300	0.021	0.004	0.042	0.066	0.005
Modoc	10	0.001	0.000	0.002	0.003	0.029
Mono	26	0.001	0.000	0.002	0.003	0.012
Monterey	2117	0.039	0.006	0.076	0.121	0.006
Napa	1650	0.012	0.002	0.023	0.036	0.002
Nevada [f]	0	0.010	0.002	0.019	0.030	N/A
Orange	21700	0.254	0.043	0.499	0.795	0.004
Placer	1200	0.026	0.004	0.051	0.082	0.007
Plumas	1249	0.002	0.000	0.004	0.006	0.000
Riverside	10498	0.171	0.029	0.335	0.534	0.005
Sacramento	6628	0.115	0.019	0.226	0.361	0.006
San Benito	250	0.005	0.001	0.011	0.017	0.007
San Bernardino	10266	0.176	0.030	0.345	0.550	0.005
San Diego	12665	0.276	0.047	0.542	0.865	0.007
San Francisco	0	0.063	0.011	0.123	0.197	N/A
San Joaquin	8035	0.058	0.010	0.114	0.183	0.002
S. Luis Obispo	1563	0.026	0.004	0.051	0.082	0.005
San Mateo	3998	0.065	0.011	0.129	0.205	0.005
Santa Barbara	3352	0.038	0.006	0.074	0.118	0.004
Santa Clara	12750	0.162	0.027	0.319	0.508	0.004
Santa Cruz	1295	0.025	0.004	0.049	0.078	0.006
Shasta	1803	0.017	0.003	0.034	0.054	0.003

TABLE IV-11 (CONTINUED)
ANTICIPATED SOLID WASTE IMPACTS ASSOCIATED WITH IMPLEMENTING THE SCM[a]

Sierra	5	0.000	0.000	0.001	0.001	0.018
Siskiyou	73	0.004	0.001	0.008	0.012	0.017
Solono	6730	0.038	0.006	0.076	0.120	0.002
Sonoma	2500	0.044	0.007	0.086	0.137	0.006
Stanislaus	1700	0.047	0.008	0.092	0.147	0.009
Sutter	0	0.008	0.001	0.016	0.025	N/A
Tehama	100	0.006	0.001	0.011	0.018	0.018
Trinity	20	0.001	0.000	0.002	0.004	0.019
Tulare	599	0.038	0.006	0.074	0.118	0.020
Tuolumne	15	0.005	0.001	0.011	0.017	0.116
Ventura	3000	0.069	0.012	0.135	0.215	0.007
Yolo	2300	0.016	0.003	0.031	0.049	0.002
Yuba[g]	1000	0.014[g]	0.002[g]	0.028[g]	0.044[g]	0.004
California Total	227572	3.202	0.640	6.283	10.127	0.004

[a] The 1998 ARB Architectural Coatings Survey sales data is used as the baseline for 1996. Coatings sales for 2010 were grown according to California population projections from the Dept. of Finance and apportioned to individual counties.

[b] Assumed that five percent of all containers from coatings affected by the SCM would be landfilled (liquid product is a hazardous waste). Also assumed that all coatings are sold in gallon containers, and that each container weighs one pound.

[c] Assumed that one percent of all containers from coatings affected by the SCM would be landfilled (liquid product is a hazardous waste). Also assumed that all coatings are sold in gallon containers, and that each container weighs one pound.

[d] Assumed that 10 percent of IM and floor coatings (both solidified product and containers) affected by the SCM would be landfilled. Also assumed that all coatings are sold in gallon containers, and that each container weighs one pound. To convert gallons to tons, it is assumed that the coatings had an average density of 10.5 pounds per gallon.

[e] Includes waste from the city and county of San Francisco.

[f] Waste is shipped to Lovelock, Nevada for disposal.

[g] Includes waste from Sutter Co.

TABLE IV-12
ANTICIPATED HAZARDOUS WASTE IMPACTS ASSOCIATED WITH IMPLEMENTING THE SCM[a]

Facility	Permitted Capacity cubic yards (1999)	Remaining Capacity cubic yards (1999)	Estimated Remaining Years (as of 1999)	Freeze-Thaw Disposal[b] cubic yards	Shelf-Life Disposal[c] cubic yards	Total Disposal cubic yards	Total Impact (% of Remaining Capacity)
Chem Waste Management, Kettleman Hills	10 million	8 million	20	76,843	15,454	92,296 (2003-2010)	1.15
Safety Kleen, Lokern	10.7 million (not yet constructed)	0.3 million	7	1,227	170	1,448 (2003-2006)	0.43
Safety Kleen, Imperial	2.6 million (not yet constructed)	0.2 million	5	252	50	302 (2003-2004)	0.15

[a] Based on cumulative disposal from 2003-2010 (Chem. Waste Management), 2003-2006 (Safety Kleen, Lokern), and 2003-2004 (Safety Kleen, Imperial.). The 1998 ARB Architectural Coatings Survey sales data is used as the baseline for 1996. Coatings sales for 2003-2010 were grown according to California population projections from the Dept. of Finance. It was assumed that each facility received disposed coatings proportionately to its fraction of the statewide remaining capacity.
[b] Assumed that five percent of all coatings affected by the SCM would be landfilled.
[c] Assumed that one percent of all coatings affected by the SCM would be landfilled .
[d] One cubic yard = 201.96 gallons.

Additionally, solvents such as Texanol and propylene glycol may be used more widely in low-VOC, water-borne formulations as alternatives to more toxic coalescing solvents such as EGBE, EGEE, EGME, and their acetates. Furthermore, diisocyanates (hexamethylene diisocyanate (HDI), methylene bisphenyl diisocyanate (MDI), and toluene diisocyanate (TDI)) may be used more widely in low-VOC, two-component IM systems as activators.

To the extent that future compliant coatings would be formulated with exempt solvents or other potentially hazardous materials, and to the extent that these materials could be accidentally released into the environment, it is conceivable that implementing the VOC limits in the SCM could create significant adverse hazards impacts.

ANALYSIS: As a result of being delisted as a VOC by the U.S. EPA, the ARB, and many districts, acetone usage has been steadily increasing. Although acetone is expected to be used to reformulate some compliant coatings, current information from coatings product information sheets (see the tables in Appendix E) indicates that acetone is only expected to be used in a limited number of coatings categories (lacquers~~, floor coatings, and waterproofing sealers~~). Therefore, it is unlikely that implementation of the SCM will substantially increase the future use of acetone throughout California. See also the discussion regarding acetone in section 3.b – Fire Protection.

While any anticipated increase in acetone usage may increase the number of trucks or rail cars that transport acetone within California, the safety characteristics of individual trucks or rail cars that transport acetone will not be affected by the SCM. The consequences (exposure effects) of an accidental release of acetone are directly proportional to the size of the individual transport trucks or rail cars and the release rate. Although the probability of an accidental release of acetone could increase, the severity of an incident involving acetone transport will not change as a result of implementing the SCM. Similarly, the severity of an accident involving the storage of acetone is not expected to change from existing conditions. This holds true for other replacement solvents but on a much smaller scale. As shown in Table IV-10, many conventional solvents are as flammable as acetone, so there would be no net change or possibly a reduction in the hazards consequences from replacing some conventional solvents with acetone.

With regard to other possible replacement solvents, based on discussions with resin manufacturers and coatings formulators, the trend in coatings technology is to replace EGBEs with less toxic/less hazardous coalescing solvents such as Texanol and propylene glycol. Staff has verified this trend by reviewing product data sheets and MSDSs for currently available, compliant low-VOC coatings. Additionally, a report prepared for the ARB (Censullo, 1996), indicates that a majority of current water-based formulations (flats and nonflats) do not contain solvents that are hazardous air pollutants (HAPs). Further, it appears that the use of solvents such as Texanol and propylene glycol in water-borne coatings formulations is prevalent today and should continue into the future, with the eventual replacement of more toxic and hazardous coalescing solvents such as EGBEs with less or nontoxic coalescing solvents.

As noted in the Water Quality section of this chapter, some reformulated two-component IM coating systems may contain diisocyanate compounds. While the use of diisocyanate compounds does not reflect the trend of using less hazardous compounds, there should be no significant increase in the risk of upset due to increased use of these compounds. Like Texanol, Oxsol 100, propylene glycol, and ethylene glycol, diisocyanates are significantly less flammable than currently used, highly flammable conventional solvents. Therefore, the increased use of compliant coatings containing diisocyanates would be offset by the decreased use of more flammable solvents.

CONCLUSION: Potential hazards impacts resulting from implementing the SCM are not expected to be significant for the following reasons. The increased use of acetone will generally be balanced by reduced usage of other equally or more hazardous materials such as MEK, toluene, xylenes, etc. Further, emergency contingency plans that are already in place are expected to minimize potential hazards impacts posed by any increased use of acetone in future compliant coatings. In addition, businesses are required to report increases in the storage of flammable and otherwise hazardous materials to local fire departments to ensure that adequate conditions are in place to protect against hazards impacts.

It is also anticipated that resin manufacturers and coatings formulators will continue the trend of using less toxic or hazardous solvents such as Texanol~~, Oxsol 100,~~ and propylene glycol in their compliant water-borne coatings. Thus, future compliant coatings will likely contain less hazardous or nonhazardous materials as compared to conventional coatings, a net benefit.

While diisocyanates are more toxic than some conventional solvents, they are significantly less flammable than currently used solvents. Thus, the overall risk of upset is not significantly increased as a result of using compliant coatings containing diisocyanates.

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PROJECT SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Because hazards impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The ARB staff has evaluated the SCM to determine potential significant cumulative hazards impacts. No significant additional project-specific hazards impacts are expected to result from implementing the SCM, and no significant cumulative adverse hazards impacts are anticipated.

CUMULATIVE IMPACT MITIGATION: None required.

b. Human Health

The NOP/IS prepared for the SCM identified potential significant adverse human health impacts associated with the proposed project, specifically, whether the use of reformulated coatings could generate human health impacts as described below.

Significance Criteria

The project will be considered to have a significant adverse human health impact if any of the following occur in any district:

- The project equals or exceeds a maximum individual cancer risk (MICR) threshold for toxic air contaminants (TACs) of one in one million (1 x 10^{-6}) for both project-specific and cumulative impacts.
- The project creates an excess cancer case of 0.5 or greater in a population subject to a cancer risk of greater than one in one million (1 x 10^{-6}).
- The project results in HAP emissions that result in a hazard index greater than or equal to 1.0.

Some industry representatives have asserted that low-VOC compliant coatings will contain compounds that are more toxic than current formulations. For example, diisocyanates (HDI, MDI, and TDI) may be used more widely in low-VOC, two-component IM systems. Manufacturers have also suggested that for some IM applications, two-component, low-VOC systems containing diisocyanates will replace existing higher-VOC, two-component and one-component systems.

Based on discussions with manufacturers, exempt solvents are considered to be viable alternatives to aid coatings manufacturers in reformulating existing coatings to meet the VOC content limits proposed in the SCM. For example, acetone may be used as a replacement solvent in lacquers~~, floor coatings, and waterproofing sealers~~. Acetone has been used in lacquers ~~and waterproofing sealers~~, but manufacturers may increase the acetone content in these coatings to comply with the SCM limits.

Coalescing solvents such as Texanol and propylene glycol may be used more widely in low-VOC water-borne formulations as alternatives to their more toxic counterparts such as EGBE, EGEE, EGME and their acetates. In certain coatings formulations such as nonflats, coalescing solvents act as plasticizers to allow the otherwise solid resin to flow together to form a film.

Using available toxicological information to evaluate potential human health impacts associated with implementing the SCM, ARB staff compared the toxicity of the most common currently used coatings solvents to solvents expected to be used in reformulated, compliant coatings. As a measure of toxicity, ARB staff compared the Threshold Limit Values (TLVs) established by the American Conference of Governmental Industrial Hygiene (ACGIH), OSHA's Permissible Exposure Limits (PELs) and Short Term Exposure Limits (STELs), the Immediately Dangerous to Life and Health (IDLH) levels recommended by the National Institute for Occupational Safety and Health (NIOSH), and health hazards developed by the National Safety Council.

As illustrated in Table IV-13, some replacement solvents have higher or less severe TLVs, PELs, STELs, and IDLHs than conventional solvents. For example, acetone is considered less toxic than most of the listed conventional solvents. However, some replacement solvents, in particular the diisocyanate group of solvents, appear to have more severe toxicological effects than conventional solvents.

To analyze the toxic effects associated with the use of compliant low-VOC coatings, the SCAQMD conducted a health risk assessment for the compounds listed in Table IV-13 consistent with the procedures in the SCAQMD's Risk Assessment Procedures for Rules 1401 and 212 and the ARB's Health Risk Assessment (HRA) Computer Program (version 2.0e).[4] A HRA is used to estimate the likelihood of an individual contracting cancer or experiencing other adverse health effects as a result of exposure to toxic air contaminants (TACs). Risk assessment is a methodology for estimating the probability or likelihood of the occurrence of an adverse health effect.

Risks from carcinogens are expressed as an added lifetime risk of contracting cancer as a result of a given exposure. For example, if the emissions from a facility are estimated to produce a risk of one in one million (1×10^{-6}) to the most exposed individual, this means that the individual's chance of contracting cancer has been increased by one chance in one million over and above his or her chance of contracting cancer from all other factors (diet, smoking, heredity, etc.). This added risk to a maximally exposed individual is referred to as a "maximum individual cancer risk" or MICR.

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[4] ARB and OEHHA staff evaluated both the methodology and conclusions reached by SCAQMD in their HRA. ARB and OEHHA staff agree with both, and the ARB staff therefore concluded that no significant adverse human health impacts will occur due to implementation of the SCM.

TABLE IV-13
TOXICITY OF COATING SOLVENTS

Conventional Solvents				
Solvents	**TLV (ACGIH) (ppm)**	**PEL (OSHA) (ppm)**	**STEL (ACGIH) (ppm)**	**IDLH (NIOSH) (ppm)**
Toluene	50	200	300	500
Xylenes	100	100	150	900
MEK	200	200	300	3,000
Stoddard solvent	100	500	Not Established	3,400
Ethyl alcohol	1000	1000	Not Established	3,300 @ 10% LEL
Methyl alcohol	200	200	250	6,00
EGBE	25	50	Not Established	700
EGEE	5	200	Not Established	500
EGME	5	25	Not Established	200
Replacement Solvents				
Solvents	**TLV (ACGIH) (ppm)**	**PEL (OSHA) (ppm)**	**STEL (ppm)**	**IDLH (ppm)**
Acetone	500	1000	750	2,500 @ 10% LEL
Texanol	Not Established	Not Established	Not Established	Not Established
Di-propylene glycol	Not Established	Not Established	Not Established	Not Established
Propylene glycol	50[1]	Not Established	Not Established	Not Established
Ethylene glycol	50	50	Not Established	Not Established
Oxsol 100	25[2]	Not Established	Not Established	Not Established
Methylene chloride	50	25	Not Established	2,300[3]
TDI	0.005	0.02	0.02	2.5
HDI	0.005	Not Established	Not Established	Not Established
MDI	0.005	0.02	0.02	7

Sources: [1] AIHA workplace environmental exposure level
[2] Manufacturer's recommendation
[3] California recommendation

To evaluate noncancer health effects from a TAC, exposure levels are estimated (just as with carcinogens) so that they can be compared to a corresponding Reference Exposure Level (REL). As for carcinogens, exposure is evaluated for the most exposed individual. Chronic exposures are evaluated using the same exposure assumptions described for carcinogens—continuously for a 70-year residential lifetime or eight to nine hours per day and 50 weeks per year for a 46-year working (commercial or industrial) lifetime. For acute exposures, the maximum hourly airborne concentration of a TAC is estimated. The health risk from exposure to a noncarcinogenic TAC is evaluated by comparing the estimated level of a sensitive receptor's exposure to the TAC to the TAC's REL. The ratio is expressed as a hazard index (HI), which is the ratio of the estimated exposure level to the REL:

$$\text{Hazard Index (HI)} = \frac{\text{Estimated Exposure Level}}{\text{Reference Exposure Level}}$$

A HI of one or less indicates that the estimated exposure level does not exceed the REL, and that no adverse health effects are expected. For CEQA purposes, the SCAQMD's significance threshold for noncarcinogenic impacts is a hazard index greater than or equal to one.

The ratio of the estimated acute level of sensitive receptor's exposure to a TAC to the acute REL is called an acute HI. The ratio of the estimated chronic level of exposure to a TAC to its chronic REL is called a chronic hazard index. Based on the foregoing HRA methodologies, the SCAQMD estimated the long-term carcinogenic, long-term chronic, and short-term acute health risks associated with the use of the above-listed compounds where toxicity data were available. Tables IV-14 through IV-16 highlight the results of this risk analysis. These tables present the amount of each compound that can be emitted and coating usage before the SCAQMD significance thresholds are exceeded. For a more detailed discussion of how the table values were derived, and the unit risk factors, chronic RELs, and acute RELs used to conduct the HRA, the reader is referred to Appendix E of this ~~Draft~~ Final Program EIR.

i. Carcinogenic Effects

PROJECT-SPECIFIC IMPACT: Discussions with resin manufacturers and coatings formulators and review of coatings product sheets indicate that TDI may be used in some low- or zero-VOC, water-borne, two-component IM coating systems. TDI is the only compound listed in Table IV-13 that has a carcinogenic unit risk factor (OEHHA, 1999a). TDI belongs to a group of compounds known as diisocyanates, which are low-molecular-weight aromatic and aliphatic compounds. HDI and MDI also belong to this group, but are not considered to be carcinogenic. These water-borne compliant formulations are intended as direct replacements for their higher-VOC, solvent-borne, two-component counterparts currently being applied. Some industry representatives have suggested that water-borne two-component systems may also replace higher-VOC, solvent-borne, one-component IM systems. Thus, there could be an incremental increase in the use of coatings containing TDI, HDI, and MDI.

Comments received on the NOP/IS indicated that the possible use of coatings containing diisocyanates used in the neighborhood of a school, as well as on school structures themselves, could cause adverse health effects.

Additional comments received on the NOP/IS indicated that implementation of the SCM will eliminate solvent-borne primers and result in increased use of sandblasting to prepare surfaces for coating with water-borne systems, thus exposing people to crystalline silica, a Proposition 65 carcinogen.

ANALYSIS: In the HRA conducted by the SCAQMD (see footnote 4), the potential cancer risks to downwind receptors and applicators of compliant coatings containing TDI were analyzed. As a worst-case scenario, SCAQMD staff assumed that approximately one percent (by weight) of the TDI in a two-component system would be emitted, although in theory these low- to zero-VOC systems should not result in volatilization of any VOCs, including TDI. The results of the HRA for the use of coatings containing TDI are shown in Table IV-14.

As shown in Table IV-14, approximately 1.5 gallons per day of coatings containing TDI can be used before the significance threshold of a MICR $>1 \times 10^{-6}$ is exceeded at a downwind receptor distance of 100 meters. At closer source receptor distances, the amount of daily coatings that can be used before the 1 x 10^{-6} threshold is exceeded are 0.13 gallons at 25 meters and 0.04 gallons at 50 meters.

TABLE IV-14
MAXIMUM INDIVIDUAL CANCER RISK FROM POTENTIAL EXPOSURES TO TDI COATINGS
(Gallons Per Day That Would Exceed a MICR of 1 x 10^{-6})

	Downwind Receptor Distances (in meters)					
	25		**50**		**100**	
Compound	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day
TDI	0.01	0.13	0.04	0.39	0.16	1.48

Regarding the comment about exposure to crystalline silica as a result of sandblasting, as discussed in the Air Quality section of this chapter, manufacturers' recommendations are the same for conventional and low-VOC coatings (*i.e.*, apply to clean, dry surfaces). It is not expected that these recommendations would change if additional coatings were to be reformulated as a result of the SCM. However, any potential increase in sandblasting would not be expected to result in increased exposure to crystalline silica for the following reasons. State law restricts outdoor abrasive blasting (including sandblasting) throughout California. Under title 17, CCR, abrasive blasting may not be performed outdoors unless specified techniques and/or materials are used. Those techniques and materials minimize the emission of fine particulate matter from blasting operations, and thus minimize public exposure to inhalable particles. Specifically, the regulation requires that outdoor blasting be conducted using either wet, hydroblasting, or vacuum blasting techniques, or must use iron shot/grit or ARB-certified abrasives. Abrasives must meet specific performance standards before they can be certified by ARB. The performance standards require that, before blasting, the abrasives shall not contain more than one percent by weight material passing a #70 U.S. standard sieve and that, after blasting, the abrasives shall not contain more than 1.8 percent by weight material five microns or smaller. As an alternative to the before-blasting requirements, the abrasive shall not produce visible emissions more than 20 percent opacity when blasted in accordance with a specified test method. A variety of abrasive types have been certified by ARB. Certified abrasives include such materials as garnet, corn cob, dry ice, sand, glass, natural mineral olivine, and nickel, copper, and coal slag.

CONCLUSION: Although the daily usage levels in Table IV-14 are quite low, significant adverse carcinogenic human health impacts are not expected for downwind residential or sensitive receptors for the following reasons. As explained above, the resultant MICR from the HRA estimates the probability of a potential maximally exposed individual contracting cancer as a result of continuous exposure to toxic air contaminants over a period of 70 years for residential and 46 years for worker receptor locations. Most, if not all, applications of low- or zero-VOC, two-component IM systems containing TDI will occur primarily in industrial settings where residential or sensitive receptors are not proximately located. Furthermore, the application of these coating systems will be for maintenance (touch-up and repair) or repaint purposes, lasting only several days to several weeks, and occurring on an intermittent basis (once every 2-3 years to every 10 years, or more). Furthermore, as shown below in the Acute Effects subsection, the amount of TDI, HDI, or MDI emitted during spraying applications is below acceptable human exposure levels. Therefore, downwind residential or sensitive receptors will not be exposed on a long-term basis to TDI concentrations that would result in significant carcinogenic human health impacts.

Significant carcinogenic impacts are also not expected for workers (coatings applicators). Discussions with resin manufacturers and coatings formulators reveal that significant cancer risks are eliminated by following the coatings manufacturers', OSHA's, and ACGIH's required and recommended safety practices for handling materials containing TDI. (See the "Acute Effects" subsection for a description of the recommended safety practices for handling materials containing TDI, as well as HDI and MDI.) According to resin manufacturers and coatings formulators, the safety practices and application techniques associated with higher-VOC, solvent-borne, two-component systems will be the same for the compliant water-borne, two-component systems, in part because some existing two-component systems also contain diisocyanates. Thus, applicators will not require additional training beyond what is currently required regarding the proper handling or proper application of these compliant coatings.

Furthermore, it appears that HDI and MDI are replacing TDI in compliant water-borne, two-component systems. Since HDI and MDI are noncarcinogenic, the replacement of TDI with HDI and MDI would eliminate the cancer risk associated with the use of these coatings.

Finally, staff concludes that increased exposure to crystalline silica will not occur because: 1) implementation of the SCM is not expected to cause an increase in sandblasting as a method of surface preparation, and 2) California law regulates the practice of abrasive blasting to minimize the emission of fine particulate matter from abrasive blasting operations, and thus minimize public exposure to inhalable particles.

ii. Chronic Effects

PROJECT-SPECIFIC IMPACT: Some industry representatives have stated that several replacement solvents that could be used to formulate compliant low-VOC coatings (TDI and HDI) could cause significant adverse chronic human health impacts. Comments received on the NOP/IS stated that the most prevalent solvent currently used in solvent-borne coatings is mineral spirits, which is neither carcinogenic nor teratogenic, and which will likely be replaced with ethylene glycol ethers and ethylene glycol ether acetates if the SCM is implemented.

ANALYSIS: To analyze the existing chronic health risks associated with solvents used in conventional coatings to downwind receptors and applicators of these coatings, the SCAQMD prepared a HRA (see footnote 4) for solvents used in conventional coatings (Table IV-15). Table IV-15 shows the number of gallons it would take on a daily basis to equal or exceed a chronic hazard index of 1.0. Since no more than 25-30 gallons can be applied per day for most coatings applications (SCAQMD, 1999), solvents that take less than approximately 25 gallons per day to contribute to a chronic hazard index of 1.0 or more could create significant human health impacts. As shown in Table IV-15, the lists of both conventional solvents and replacement solvents contain compounds where typical rates of usage could contribute to a chronic hazard index greater than or equal to 1.0.

As with risks associated with carcinogens, risks associated with compounds that pose chronic risks are based on long-term continuous exposure. Architectural coatings are applied on an infrequent and intermittent basis. For first-time painting or repainting situations, application of coatings occurs all at one time over the course of several hours or weeks, depending on the specific nature of the job. For touch-up and maintenance applications, actual application of coatings takes several hours to several weeks to complete, depending on the specific nature of the job, and occurs periodically throughout the year or over the course of several years. Therefore, because of the intermittent and infrequent application of architectural coatings, long-term exposure of downwind residential or sensitive receptors to chronic health effects is not anticipated from implementation of the SCM.

TABLE IV-15
CHRONIC EXPOSURE RISK ASSESSMENT
(Gallons Per Day That Would Exceed a Chronic Hazard Index of 1.0)

	Downwind Receptor Distances					
	25m		**50m**		**100m**	
Conventional Solvents	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day
Toluene	30.06	28.63	91.14	86.80	341.12	324.88
Xylenes	45.09	42.94	136.71	130.20	511.68	487.32
MEK	150.30	143.14	455.71	434.01	1705.61	1624.39
Isopropyl Alcohol	300.60	286.28	911.41	868.01	3411.22	3248.78
Glycol Ethers/Acetates	3.01	2.86	9.11	8.68	34.11	32.49
EGBE	3.01	2.86	9.11	8.68	34.11	32.49
EGEE	30.060	28.628	91.141	86.801	341.122	324.878
EGME	3.01	2.86	9.11	8.68	34.11	32.49
Replacement Solvents						
Propylene Glycol	450.90	429.43	1367.12	1302.02	5116.83	4873.18
Ethylene Glycol	60.12	57.26	182.28	173.60	682.25	649.76
Methylene Chloride	450.90	429.43	1367.12	1302.02	5116.83	4873.18
Isocyanate	0.01	0.14	0.043	0.41	0.16	1.54
TDI	0.01	0.10	0.03	0.30	0.12	1.14
HDI	0.00	0.01	0.01	0.04	0.02	0.16

EGBE is a coalescing solvent currently used in some water-borne formulations. Based on discussions with resin manufacturers and coatings formulators, the current trend in coatings technology is to replace EGBEs, or glycol ethers, with less toxic or less hazardous coalescing solvents such as Texanol and propylene glycol. Staff has verified this trend by reviewing product data sheets and material safety data sheets (MSDSs) for currently available compliant low-VOC coatings. Additionally, a report prepared for ARB (Censullo, 1996) indicates that a majority of current water-based formulations (flats and nonflats) contain non-HAP solvents. The report, which is intended to upgrade the species profiles for a number of sources within the general categories of industrial and architectural coatings operations, identified the four most common solvents in the 52 randomly chosen water-borne coatings (flats and nonflats) as: Texanol (found in 37 of 52); propylene glycol (31 of 52); diethylene glycol butyl ether (23 of 52); and ethylene glycol (14 of 52). It appears from this information that the use of non-HAP solvents such as Texanol and propylene glycol in water-borne coatings formulations is already becoming more prevalent. This trend should continue in the future with the eventual replacement of more toxic and hazardous coalescing solvents such as EGBEs with less toxic or hazardous materials.

An article by the Chemical Manufacturers Association, “A Review of the Uses and Health Effects of Ethylene Glycol Monobutyl Ether” (cited in SCAQMD, 1999), indicates that based on recent studies, there is little possibility of significant adverse human health effects at exposure levels encountered in the typical workplace. Further, the article points out that exposures to EGBE in consumer use would be considerably lower than the ACGIH exposure limit of 25 ppm. The article provided information that workers exposed to EGBE levels twice the ACGIH exposure limit did not experience adverse health effects. To the extent that implementation of the SCM would accelerate the current trend away from EGBEs, human health benefits would be expected.

CONCLUSION: Chronic exposure of coatings applicators to coatings containing replacement solvents, in particular the diisocyanate compounds, is not expected to produce significant chronic risks since applicators will be following the manufacturers' and ACGIH's recommended safety practices, and OSHA's required safety practices, for handling these materials. These recommended safety practices are discussed below in the "Acute Effects" subsection. Because the safety practices and application techniques associated with higher-VOC solvent-borne coatings are the same as those for compliant water-borne coatings, applicators will not need additional training regarding the proper handling or application of compliant coatings containing TDI.

In some compliant water-borne IM coatings, it appears that TDI and HDI are being replaced with MDI. Unlike TDI and HDI, MDI is not currently listed as a chronic TAC in the Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 1999c). Furthermore, manufacturers are moving away from using EGBE in their water-borne formulations, replacing them with less toxic or less hazardous coalescing solvents such as Texanol and propylene glycol.

Lastly, because of the intermittent and infrequent application of architectural coatings, long-term exposure of downwind residential or sensitive receptors to chronic health effects is not anticipated from implementation of the SCM.

iii. Acute Effects

PROJECT-SPECIFIC IMPACT: Some industry representatives have suggested that several replacement solvents that could be used to formulate compliant low-VOC coatings could cause significant adverse acute human health impacts.

Acute Worker Health Analysis. Several of the solvents used in conventional coatings that were analyzed for chronic health effects have also been analyzed for short-term or acute effects. Table IV-16 presents the results of the SCAQMD's acute HRA for the solvents used in conventional coatings (see footnote 4). (There are no acute RELs for any of the replacement solvents, so they could not be analyzed in the HRA. However, see the discussion of diisocyanates, below.)

As shown in Table IV-16, even low usage of conventional coatings formulated with EGBE, EGEE, or EGME could trigger acute human health impacts. However, as noted earlier, resin manufacturers and coatings formulators are tending towards replacing EGBE, EGEE, and EGME with less toxic coalescing solvents such as Texanol and propylene glycol in conventional, higher-VOC coatings. These less toxic coalescing solvents will likely be used to formulate compliant low-VOC coatings. To a certain extent, the SCM may have the beneficial effect of encouraging or accelerating the trend of formulating coatings with less toxic or nontoxic solvents. Therefore, implementation of the SCM may ultimately provide human health benefits.

TABLE IV-16
SHORT-TERM ACUTE EXPOSURE RISK ASSESSMENT FOR CONVENTIONAL SOLVENTS
(Gallons Per Day That Would Exceed an Acute Hazard Index of 1.0)

	Downwind Receptor Distances					
	25m		**50m**		**100m**	
Compound	**Emissions** lbs/hr	**Usage** gals/day	**Emissions** lbs/hr	**Usage** gals/day	**Emissions** lbs/hr	**Usage** gals/day
Toluene	20.00	152.38	39.98	304.58	107.10	815.96
Xylenes	11.00	83.81	21.99	167.52	58.90	448.78
MEK	6.50	49.52	12.99	98.99	34.81	265.19
Isopropyl Alcohol	1.60	12.19	3.20	24.37	8.57	65.28
Methyl Alcohol	14.00	106.67	27.98	213.21	74.97	571.17
Glycol Ethers/Acetates	0.75	5.71	1.50	11.42	4.02	30.60
EGBE	7.00	53.33	13.99	106.60	37.48	285.59
EGEE	0.19	1.41	0.37	2.82	0.99	7.55
EGME	0.05	0.35	0.09	0.71	0.25	1.90
Methyl Chloroform	34.00	259.05	67.96	517.78	182.06	1387.14
Methylene Chloride	1.75	13.33	3.50	26.65	9.37	71.40

Discussions with coatings manufactures and review of coatings product data sheets indicate that diisocyanates (TDI, HDI, and MDI) may be used to formulate some low-VOC, water-borne two-component IM coatings (SCAQMD, 1999). These compliant water-borne formulations are intended as direct replacements for their higher-VOC, solvent-borne, two-component counterparts, which also contain diisocyanates. However, some industry representatives have asserted that these water-borne two-component systems may also replace solvent-borne, one-component IM systems, which for the most part do not contain diisocyanates. Thus, there could be an incremental increase in the use of coatings containing TDI, HDI, and MDI.

Diisocyanates, including TDI, HDI, and MDI, are low-molecular-weight aromatic and aliphatic compounds. These compounds are widely used in the manufacture of flexible and rigid foams, fibers, coatings, and elastomers, and are increasingly being used in the manufacture of automobiles and building insulation materials as well as autobody repair. The major route of occupational exposure to diisocyanates is inhalation of the vapor or aerosol; exposure may also occur through skin contact during the handling of liquid diisocyanates. Occupational exposure could potentially occur during the mixing and application of two-component IM coatings containing diisocyanates.

Diisocyanates are powerful irritants to the mucous membranes of the eyes and gastrointestinal and respiratory tracts. Direct skin contact with diisocyanates can also cause marked inflammation. Respiratory irritation may progress to a chemical bronchitis with severe bronchospasm.

After one or more exposures, diisocyanates can also sensitize workers, making them subject to severe asthma attacks if they are exposed again—even at concentrations below the NIOSH REL. Death from severe asthma in sensitized subjects has been reported. Additionally, sporadic cases of hypersensitivity pneumonitis (HP) have also been reported in workers exposed to diisocyanates. Individuals with acute HP typically develop symptoms four to six hours after exposure.

The main concern is when the coating is sprayed onto the substrate. During the application process, it may be possible that the diisocyanates could volatilize and come into contact with the worker. SCAQMD staff contacted resin manufacturers and coatings formulators to obtain additional information about TDI, HDI, and MDI (SCAQMD, 1999). Resin manufacturers indicated that there is currently a trend to replace TDI, which is also a carcinogen, with the less hazardous diisocyanate compounds, HDI and MDI. Furthermore, a resin manufacturer indicated that use of a plural spraying system would minimize the amount of diisocyanate exposure because the diisocyanate compounds bind to the coating constituents during this type of spraying application.

Although adverse human health effects from acute exposures to TDI, HDI, and MDI may occur, OEHHA has not finalized acute RELs for TDI, HDI, and MDI. As a result, there is currently no approved method for analyzing acute health impacts from these compounds. Further, even conservatively using the short-term exposure limit (STEL) of 0.02 for TDI as a surrogate REL for TDI, HDI, and MDI, coatings applicators would have to apply complicated two-component IM systems at a rate of four gallons or more per hour (assuming a sensitive receptor is located at a distance of 100 meters) to exceed an acute HI of 1.0. Investigation reveals that it is not likely that painters could apply two-component systems at this rate (SCAQMD, 1999). Further, the formulation of compliant IM coating systems not containing diisocyanates and the development of spray technology that minimizes diisocyanate emissions should be available when the SCM’s VOC content limits go into effect. Lastly, as demonstrated below in the discussion concerning public exposure to diisocyanates, workers’ exposures to diisocyanates are for the most part below the acceptable levels. Consequently, the SCM is not expected to result in significant adverse impacts to coatings applicators.

In addition, significant adverse acute health impacts are not expected to occur as a result of implementing the SCM if workers applying two-component coating systems containing diisocyanates follow OSHA’s required, and the coatings manufacturers’ and ACGIH’s recommended, safety practices for handling materials containing diisocyanates. The following paragraphs summarize some of the safety measure required or recommended by NIOSH and OSHA to reduce acute human health impacts associated with the use of compliant coatings containing diisocyanates.

As noted previously, there is already a trend in the coatings industry to move away from reformulating coatings with hazardous materials to less or nonhazardous materials. Therefore, when feasible, coatings applicators should use coatings that contain less hazardous materials. In place of two-component IM systems that contain diisocyanates, coatings applicators can use one-component low-VOC IM systems. Other safety measures to protect individuals against exposure to diisocyanates are described in the following paragraphs.

Worker Isolation – Areas containing diisocyanates should be restricted to essential workers. If feasible, these workers should avoid direct contact with diisocyanates by using automated equipment operated from a control booth or room with separate ventilation.

Protective Clothing and Equipment – When there is potential for diisocyanate exposure, workers should be provided with and required to use appropriate personal protective clothing and equipment such as coveralls, footwear, chemical-resistant gloves and goggles, full face shields, and suitable respiratory equipment.

Respiratory Protection – Only the most protective respirators should be used for situations involving exposures to diisocyanates because they have poor warning properties, are potent sensitizers, or may be carcinogenic. These respirators include:

- Any self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode, and
- Any supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

Any respiratory protection program must, at a minimum, meet the requirements of the OSHA respiratory protection standard [29 CFR 1910.134]. Respirators must be certified by NIOSH and MSHA according to 30 CFR or by NIOSH (effective July 19, 1995) according to 42 CFR 84. A complete respiratory protection program should include: (1) regular training and medical evaluation of personnel, (2) fit testing, (3) periodic environmental monitoring, (4) periodic maintenance, inspection, and cleaning of equipment, (5) proper storage of equipment, and (6) written standard operating procedures governing the selection and use of respirators. The program should be evaluated regularly. The following publications contain additional information about selection, fit testing, use, storage, and cleaning of respiratory equipment: NIOSH Guide to Industrial Respiratory Protection (NIOSH, 1987a) and NIOSH Respiratory Design Logic (NIOSH 1987b).

Worker and Employer Education – Worker education is vital to a good occupational safety and health program. OSHA requires that workers be informed about:

- Materials that may contain or be contaminated with diisocyanates;
- The nature of the potential hazard [29 CFR 1910.1200]. Employers must transmit this information through container labeling, MSDSs, and worker training;
- The serious health effects that may result from diisocyanate exposures; and
- Any materials that may contain or be contaminated with diisocyanates.

Additionally, workers should take the following steps to protect themselves from diisocyanate exposure:

- Be aware that the highest diisocyanate concentrations may occur inside containment structures.
- Use appropriate respiratory protection when working with diisocyanates.
- Wash hands and face before eating, drinking, or smoking outside the work area.
- Shower and change into clean clothes before leaving the worksite.
- Participate in medical monitoring and examination programs, air monitoring programs, or training programs, offered by your employer.

According to resin manufacturers and coatings formulators, the above safety practices and application techniques recommended for future compliant low-VOC coatings are currently used for conventional, solvent-borne, two-component systems. Thus, applicators will not require additional training regarding the proper handling or application of compliant coatings containing diisocyanates. This will further reduce the applicator's exposure to diisocyanates.

Acute Sensitive Receptor Health Analysis. Most, if not all, applications of two-component IM systems containing diisocyanates will occur in industrial settings where residential or sensitive receptors are not located within 100 meters. However, some industry representatives have asserted that there are certain applications of these coatings where the public could be exposed, such as coating of bridges.

Various health studies indicate that the public's primary exposure to diisocyanates would be through the spraying of two-component IM systems. Controlled laboratory monitoring by Mobay[5] showed nondetectable air concentrations of HDI during mixing of a two-component system containing HDI. Field monitoring conducted by Caltrans showed nondetectable HDI air concentrations during hand brushing and rolling of a one-component system containing HDI. Additionally, as shown in Table IV-17 below, field monitoring studies conducted by Mobay revealed that HDI and MDI concentrations were well below thresholds recommended by ACGIH and OSHA during brushing and rolling of one-component IM topcoats (one system containing HDI and the other containing MDI), as well as during spraying of a two-component IM system containing HDI. Therefore, it is not expected that the general public would suffer significant adverse acute health impacts from exposure to diisocyanates resulting from the mixing and application of compliant one- or two-component IM systems.

It should again be noted that other water-borne technologies are in development that could be viable replacements for some applications of low-VOC, two-component IM systems containing diisocyanates. For example, some resin manufacturers and coatings formulators are offering low-VOC, water-borne, acrylic, acrylic/epoxy, or acrylic urethane dispersed one-component IM systems, instead of two-component polyurethane systems containing diisocyanates. Consequently, implementing the SCM is not expected to result in significant adverse impacts to sensitive receptors.

CONCLUSION: Based upon the above considerations, significant adverse acute human health impacts are not expected as a result of implementing the SCM.

OVERALL CONCLUSION: Based upon the preceding analyses, implementation of the SCM is not expected to create significant adverse carcinogenic, chronic, or acute human health impacts. Although TDI, which is classified as a carcinogen, could be used in low-VOC, two-component IM coatings, adverse impacts are not expected because application of IM coatings occurs primarily in industrial settings where sufficient safety equipment and procedures are in place to prevent significant exposures. Also, the application of these coating systems will be for maintenance (touch-up and repair) or repaint purposes, lasting only a few days to weeks, and occurring on an intermittent basis (once every two years to every 10 years or more). Based on these intermittent exposures, increased cancer risks are negligible. Furthermore, the coatings

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[5] Mobay is now Bayer.

industry is moving away from using TDI to using noncarcinogens, such as HDI or MDI, to formulate low-VOC, two-component coatings.

ARB staff does not antipate increased exposures to the carcinogen, crystalline silica, from sandblasting activities because implementation of the SCM is not expected to cause an increase in sandblasting as a method of surface preparation. Furthermore, California law regulates the practice of abrasive blasting to minimize the emission of fine particulate matter from abrasive blasting operations, and thus minimize public exposure to inhalable particles.

No significant chronic human health impacts are expected from implementing the SCM. In the context of worker exposure, the use of personal protective equipment should provide adequate protection to applicators during coatings application. Also, as mentioned above in the discussion of carcinogens, only intermittent exposures are anticipated, particularly for IM coatings. Furthermore, the current trend in coatings technology is to replace EGBEs, or glycol ethers, with less toxic or less hazardous coalescing solvents such as Texanol, ethylene glycol, and propylene glycol.

Finally, no significant acute human health effects are expected from implementing the SCM. Less toxic coalescing solvents will likely be used to formulate some future compliant coatings. Also, the development of spray technology will further reduce diisocyanate emissions. Further, to exceed an acute hazard index of 1.0, painters would have to apply complicated, two-component coatings at a rate of four gallons or more per hour. Investigation reveals that it is not likely that painters could apply two-component systems at this rate. Lastly, based on actual field monitoring data, the brushing, rolling, or spraying of one- or two-component, low-VOC, IM systems containing diisocyanate compounds should not expose the public at large to significant adverse human health impacts. The concentrations of diisocyanate compounds emitted during the application of these IM systems are below established health protective thresholds. In the context of worker exposure, the use of personal protective equipment should provide adequate protection to applicators during coatings application.

PROJECT SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Because human health impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The ARB has evaluated the SCM to determine potential significant cumulative human health impacts. No significant, additional, project-specific human health impacts are expected to result from implementing the SCM, and no significant, cumulative, adverse human health impacts are anticipated.

D. ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

The NOP/IS concluded that the environmental impact areas identified in the following subsections would not be significantly adversely affected by implementation of the SCM. Therefore, these environmental areas were not further analyzed in this ~~Draft~~ Final Program EIR. A brief discussion of why the SCM will not significantly adversely affect each of these environmental areas is provided below.

1. Land Use and Planning

Implementation of the SCM will not cause significant adverse impacts to land uses or land use planning in California. Any increased activities are expected to occur at existing facilities, and no new facilities are likely to be constructed which would result in any land use impacts.

No new development or alterations to existing land use designations will occur as a result of implementing the SCM. It is not anticipated that existing land uses located throughout California would require additional land or require rezoning to continue current operations. Therefore, no significant adverse impacts affecting existing or future land uses are expected.

Present or planned land uses in California will not be affected as a result of implementing the SCM. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed SCM.

2. Population and Housing

Implementation of the proposed SCM will primarily affect the formulation of architectural coatings and is not anticipated to generate any significant effects, either direct or indirect, on California's population as no additional workers are anticipated to be required. Further, implementation of the SCM is not expected to cause a relocation of population within California. As a result, housing in California is not expected to be affected by the SCM. New housing construction is not expected to be affected by the use of compliant, lower-VOC coatings.

Additionally, implementation of the SCM is not expected to contribute to any significant housing cost increases because reformulated coatings are currently being sold at prices comparable to conventional coatings. Direct economic impacts are not required to be analyzed pursuant to CEQA unless they also have a significant, direct effect on physical environmental parameters. Economic impacts associated with the SCM will be discussed in the ARB Staff Report for the SCM.

Table IV-17
Short-term Acute Exposure From the Spraying of a Two-Component IM system containing HDI poly-isocynate

Fleming Park Bridge, Neville Island, Pennsylvania		
Spraying Two-Component Polyurethane Intermediate Coat		
Sample Site	**Monomeric HDI (ppb)**	**HDI Poly-Isocyanate (mg/m^3)**
Painter #1	2.4	2.5
Painter #2	1.9	2.2
Painter #3	4.1	5.2
Downwind 50 ft*	0.5	<0.02
Deck	0.6	0.09
Under the Bridge	<0.4	0.02
TLV/STEL	**20.0****	**1.0*****
Spraying Two-Component Polyurethane Top Coat		
Sample Site	**Monomeric HDI (ppb)**	**HDI Poly-Isocyanate (mg/m^3)**
Painter #1	4.6	1.65
Painter #2	4.0	1.81
Mixer/Supervisor	0.7	0.03
Deck	<0.06	<0.03
In Truck	<0.06	<0.03
Under the Bridge 25 ft*	<0.07	<0.03
Under the Bridge 25 ft*	<0.07	<0.07
Under the Bridge 15 ft*	1.6	0.8
Downwind 50 ft*	1.3	0.8
Mixing Area	0.8	0.04
TLV/STEL	**20.0****	**1.0*****
Mobay New Martinsville, WV Plant		
Spraying Two-Component Polyurethane Top Coat on Chemical Storage Tank		
Sample Site	**Monomeric HDI (ppb)**	**HDI Poly-Isocyanate (mg/m^3)**
Painter	0.9	0.14
Painter Helper	<0.2	<.0.02
Downwind 25 ft* (North)	<0.2	<.0.02
Above Painters	<0.2	<.0.02
East 25 ft*	<0.2	<.0.02
Downwind 50 ft*	<0.2	<.0.02
West 15 ft*	<0.2	<.0.02
Upwind 15 ft*	<0.3	<.0.03
TLV/STEL	**20.0****	**1.0*****
Spraying Two-Component Polyurethane Top Coat on Waste Treatment Tank		
Sample Site	**Monomeric HDI (ppb)**	**HDI Poly-Isocyanate (mg/m^3)**
Painter	0.9	0.16
Upwind 15 ft*	0.9	<0.04
Downwind 15 ft*	1.4	0.24
Downwind 35 ft*	<0.4	<0.04
STEL	**20.0****	**1.0*****

* Distances are average number of feet from spray gun.

** ACGIH has established a Threshold Level Value as an eight hour Time-Weighted Average (TLV-TWA) for HDI of 5 parts per billion (ppb). Although Permissible Exposure Limits (PELs) have been established for several diisocyanate compounds, federal OSHA has not established on for HDI. Mobay (now Bayer) endorses the ACGIH's Short Term Exposure Limit (STEL) of 20 ppb for HDI. This concentration should not be exceeded even for brief periods.

*** ACGIH and federal OSHA have not TLV-TWA or a PEL for HDI poly-isocyanates. However, Mobay (now Bayer) recommends a TLV-TWA of 0.5 mg/m^3 for HDI poly-isocyanates. Mobay (now Bayer) also recommends a short STEL (averaged over 15 minutes) of 1 mg/m^3 for HDI poly-isocyanates.

3. Geophysical

Architectural coatings are applied to buildings, stationary structures, roads, etc. The proposed amendments affect coatings formulators and have no effects on geophysical formations in California. Additionally, because add-on control equipment will not be used to reduce VOC emissions from architectural coatings, implementation of the SCM is not expected to result in additional exposure of people or property to geological hazards such as earthquakes, landslides, mudslides, ground failure, or other natural hazards. Therefore, implementation of the SCM is not expected to create potential adverse geophysical impacts.

4. Biological Resources

Implementation of the SCM will not cause impacts to sensitive habitats of plants or animals because all activities will typically occur at construction, industrial, or commercial sites already in operation. No new development that could potentially adversely affect plant and animal life is anticipated. Potential impacts to aquatic life from releases of any paint and associated wastewater disposed of in sewers and storm drains are discussed in the Water Quality section of this chapter. The analysis of water quality impacts to both groundwater and surface water concluded that implementing the SCM would not generate significant adverse water quality impacts.

5. Energy and Mineral Resources

a. Electricity

Because add-on control equipment will not likely be used to comply with the provisions of the SCM, no additional energy use is expected from such equipment. Additionally, implementation of the SCM will not substantially increase the number of businesses or amount of equipment in California. Furthermore, energy use associated with specialized spray equipment (plural systems) used to apply reformulated two-component coatings is expected to be negligible. Therefore, no increases in electricity consumption are expected from implementation of the SCM. Consequently, elctricity use impacts are not considered to be significant.

Some industry representatives have asserted that implementing the SCM would increase the demand for electrical power to manufacture more coatings than are currently manufactured. This comment is based on the assumption that for a variety of reasons, low-VOC coatings are inferior to high-VOC coatings, and that the SCM will result in an overall increase in coatings use. All of the issues that supposedly would result in more coatings use have been analyzed in the Air Quality section of this chapter. In general, staff evaluation of coatings product data sheets for a substantial number of conventional and low-VOC coatings (see the tables in Appendix E and Table IV-2) concluded that increased manufacturing of low-VOC coatings will not occur, and therefore increases in electricity demand are not expected.

b. Natural Gas

The consumption of natural gas in California is not expected to increase as a result of implementation of the SCM. Electricity will be the primary source of energy used to power spray equipment operated at various sites throughout California. Consequently, natural gas energy impacts from implementing the SCM are not considered to be significant.

c. Fossil Fuels

Implementation of the SCM is not expected to substantially increase the consumption of nonrenewable fossil fuel resources (diesel and gasoline) within California. It is not anticipated that there will be additional trips associated with more frequent application of compliant coatings, and any additional trips due to increased disposal of compliant coatings will be insignificant. Thus, even if there were an incremental increase in fuel usage, it is expected to be negligible. Therefore, fossil fuel energy impacts from implementing the SCM are not considered to be significant.

d. Mineral Resources

Some industry representatives have asserted that implementation of the SCM would require the production of more coatings in the future than are currently manufactured. Allegedly, this would result in the disposal of more paint cans, resulting in a wasteful use of a mineral resource (metal). As discussed in the “Electricity” subsection above, available information on low-VOC coatings contradicts the assertion that more low-VOC coatings would need to be manufactured than would otherwise be necessary with conventional coatings. Consequently, the SCM is not expected to result in a wasteful use of mineral resources.

A comment received on the NOP/IS stated there could be non-renewable resources impacts resulting from the use of non-paint alternatives such as vinyl or aluminum siding or interior wall coverings, in lieu of unsatisfactory paints. Based on the ARB’s staff’s analysis of currently compliant coatings, implementation of the proposed SCM is not expected to result in substitution of low-VOC coatings with non-paint alternatives. It is highly speculative that users will abandon paints altogether for non-paint substitutes when compliant performing coatings are available. It should be noted that non-paint substrates such as stucco, siding, and concrete are used throughout California. However, their use for the most part has nothing to do with the availability of compliant performing coatings, but more with user preferences.

6. Noise

No significant noise impacts are associated with the use of architectural coatings. California coatings formulators potentially affected by the SCM are predominantly located in existing industrial or commercial areas. It is assumed that these facilities are subject to and in compliance with existing local noise standards. In addition to noise generated by current operations, noise sources in each area include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses.

In general, the primary noise source at existing facilities is from vehicular traffic, such as trucks transporting raw materials to and hauling finished products, wastes, or other materials away from the facility, and miscellaneous noise such as spray equipment (compressors, spray nozzles) and heavy equipment use (forklifts, trucks, etc.). Noise is generated during operating hours, which generally range from 6 a.m. to 5 p.m. Monday through Friday. Implementation of the SCM is not expected to alter noise from existing noise generating sources. It is also likely that affected companies are operating in compliance with any local noise regulations that may exist in their respective communities. Therefore, no significant noise impacts are expected from the proposed project.

Additionally, implementation of the SCM is not expected to result in significant noise impacts in residential areas. As with industrial or commercial areas, it is assumed that these areas are subject to local community noise standards. Contractors or do-it-yourselfers applying compliant coatings in residential areas are expected to comply with local community noise standards. In any event, there should be no increase in noise from coatings application as a result of implementing the SCM.

One comment received on the NOP/IS indicated that because water-borne coatings require more thorough surface preparation compared to solvent-borne coatings, and because solvent-borne primers would no longer be available if the SCM were implemented, more power washing and abrasive blasting will occur, generating noise in residential as well as industrial areas. As discussed in the Air Quality section of this chapter, low-VOC coatings do not require substantially different surface preparation, including power washing or abrasive blasting, than conventional coatings. Moreover, any additional power washing or abrasive blasting would be subject to the same local community noise standards as are current practices. Thus, no additional noise is expected from increased power washing or sandblasting as a result of implementing the SCM.

Some industry representatives have asserted that noise impacts would increase because low-VOC coatings have a lower coverage area than conventional coatings, so spray equipment would be used for longer periods of time. As already discussed, low-VOC coatings generally have a coverage area comparable to conventional coatings (see the “More Thickness” discussion in the Air Quality section of this chapter). Further, coatings application systems that rely on pressure and a power source are available that have very low noise levels associated with them. Consequently, no significant adverse noise impacts are anticipated.

7. Aesthetics

The proposed SCM does not require any changes in the physical environment that would obstruct any scenic vistas or views of interest to the public. In addition, no major changes to existing facilities or stockpiling of additional materials or products outside of existing facilities are expected because any physical changes would occur at existing industrial or commercial sites. Therefore, no significant impacts adversely affecting existing visual resources such as scenic views or vistas are anticipated to occur.

A comment received on the NOP/IS indicated that the ~~Draft~~ Final Program EIR must analyze aesthetics impacts resulting from the ban of over 90 percent of all architectural coatings. First, implementation of the SCM will not result in the ban of over 90 percent of all architectural coatings, as low-VOC coatings that meet the proposed limits in the SCM are already available and being used for many applications (see Table II-2). Based upon information gathered by ARB staff on these currently available compliant products, which have performance characteristics comparable to conventional coatings, significant aesthetic impacts are not expected.

Another comment received on the NOP/IS stated that the ~~Draft~~ Final Program EIR must analyze aesthetics impacts from the elimination of the anti-graffiti coatings category. However, based on the availability of anti-graffiti systems that comply with the proposed SCM VOC content limits, ARB staff anticipates that the anti-graffiti coatings category will not be eliminated and that implementation of the SCM will not result in significant aesthetic impacts.

8. Cultural Resources

There are existing laws that protect and mitigate potential impacts to cultural resources. Should archaeological resources be found during the application of architectural coatings to newly constructed or existing structures, the application of such coatings would cease until a thorough archaeological assessment was conducted. Furthermore, the application of architectural coatings would almost always occur after construction, where archaeological resources would have already been disturbed. Implementation of the SCM is therefore not anticipated to result in any activities or promote any programs that could have a significant adverse impact on cultural resources in California.

One comment received on the NOP/IS stated that implementation of the SCM may jeopardize the maintenance of historic buildings because the unavailability of traditional coatings will make maintenance of these buildings more difficult. The commenter stated that it may not be possible to find acceptable substitute products to maintain both the historical and physical integrity of these structures, which is considered especially problematic with the elimination of solvent-borne primers. Staff does not agree that there would be any such impacts. Based upon information on currently available compliant products, performance characteristics of low-VOC products should be sufficient to meet the weathering impacts on outdoor structures. As discussed in the Air Quality section of this chapter, staff's review of the NTS study and product data sheets revealed that water-borne coatings had durability characteristics similar to conventional, solvent-borne coatings and thus do not require more touch-up and repair work. Water-borne primers also have performance characteristics similar to solvent-borne primers.

Consequently, significant adverse impacts to cultural resources are not anticipated as a result of implementing the SCM.

9. Recreation

Implementation of the SCM will not generate additional demand for or otherwise affect land used for recreational purposes. Further, as already explained in the Land Use and Planning, Aesthetics, and Cultural Resources sections above, the proposed amendments are not expected to have adverse affects on land uses in general. No significant adverse effects on recreational facilities were identified.

Some industry representatives have indicated that demand for parks would increase due to increased job losses and unemployed workers. Implementation of the SCM is not expected to result in significant job losses and, therefore, this is not a realistic adverse impact. Even if industry were correct in their assumptions that low-VOC coatings are inferior and more coatings would have to be manufactured and used, such a scenario would result in *more* demand for coatings, and presumably *more* demand for workers to manufacture and apply the coatings. The final version of the Staff Report for the SCM will include the ARB staff's economic assessment that addresses cost and related employment impacts associated with adoption and implementation of the SCM.

10. Economic Impacts

Under CEQA, detailed analyses of economic effects are necessary only when such effects have significant impacts on physical environmental parameters. The SCM would establish VOC content limits for various categories of architectural coatings, and this would have no impact on physical or environmental parameters. <u>However, Chapter VIII of the Staff Report contains an analysis of the economic impacts of the SCM.</u>

E. OTHER CEQA TOPICS

The following sections address various topics and issues required by CEQA such as growth inducement, short-term versus long-term effects, and irreversible changes.

1. Irreversible Environmental Changes

CEQA Guidelines §15126(c) requires an environmental analysis to consider "any significant irreversible environmental changes which would be involved if the proposed action should be implemented." In particular, CEQA Guidelines §15126.2(c) indicates that "[u]ses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified."

The Initial Study identified air quality, water, public services, transportation/circulation, solid waste/hazardous waste, and hazards as potential impact areas to be evaluated. The analysis presented in the ~~Draft~~ <u>Final</u> Program EIR concluded that no significant adverse project-specific or cumulative impacts would occur to any of these environmental areas.

For example, the air quality impacts analysis included an evaluation of eight issues identified by industry that might produce significant adverse air quality impacts. The results of this analysis indicated that there was no evidence supporting significant adverse air quality impacts as a result of any of the eight issues. The analysis of water impacts indicated that an incremental increase in the amount of wastewater from cleaning coating equipment could occur, but this increase would not be significant. The analysis of public services and transportation/ circulation concluded that the SCM would not create any significant adverse impacts to these areas. The solid waste/hazardous waste analysis included an evaluation of the potential for an incremental increase in solid waste impacts resulting from some types of coatings that may have a shorter pot life or shorter shelf life, or may be less able to withstand freeze-thaw conditions than conventional coatings. A worst-case analysis was performed and it was determined that even if there were an incremental increase in solid waste impacts, this increase would not be significant. The analysis of hazards impacts indicated that future compliant low-VOC coatings could be formulated with hazardous materials. However, solvents used in low-VOC coatings are typically less hazardous than solvents used in conventional coatings. Therefore, hazards impacts are considered to be insignificant. Further, because IM coatings are typically applied in industrial settings where safety equipment, training, and procedures are in place, workplace exposures to potentially hazardous coatings would be minimal. In addition, because architectural coatings are applied on an as-needed basis, continuous exposures would not occur. As a result, no significant cancer or noncancer human health impacts are anticipated.

As can be seen by the information presented in this ~~Draft~~ Final Program EIR, the proposed project would not result in irreversible environmental changes or the irretrievable commitment of resources.

2. Potential Growth-Inducing Impacts

CEQA Guidelines §15126(d) requires an environmental analysis to consider the "growth-inducing impact of the proposed action." CEQA Guidelines §15126.2(d) states that the ~~Draft~~ Final Program EIR shall "[d]iscuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment."

As already explained in the Land Use and Planning, Aesthetics, and Cultural Resources sections above, implementing the SCM primarily affects existing coatings formulation companies and will not, by itself, have any direct or indirect growth-inducing impacts on California businesses because it is not expected to foster economic or population growth or the construction of additional housing.

F. CONSISTENCY

CEQA Guidelines §15125(d) states that “[t]he EIR shall discuss any inconsistencies between the proposed project and applicable general plans and regional plans. Such regional plans include, but are not limited to, the applicable air quality attainment or maintenance plan or State Implementation Plan, area-wide waste treatment and water quality control plans, regional transportation plans, regional housing allocation plans, habitat conservation plans, natural community conservation plans and regional land use plans for the protection of the Coastal Zone, Lake Tahoe Basin, San Francisco Bay, and Santa Monica Mountains.” The following is a brief discussion of how the SCM is consistent with these plans.

1. Consistency with State Implementation Plan

The federal Clean Air Act (Act) requires states to prepare State Implementation Plans (SIPs) describing how they will meet the National Ambient Air Quality Standards. Under the 1990 Amendments to the Act, new SIPs for all serious, severe and extreme federal ozone nonattainment areas were due by November 15, 1994. In order to comply with the Act, in November 1994 the ARB adopted California’s 1994 SIP for ozone. The SIP is California’s blueprint for meeting the one-hour national ambient air quality standard for ozone. It includes rules adopted by individual local air districts in nonattainment areas, as well the districts’ commitments to achieve additional emission reductions by adopting new control measures. The SIP also contains the ARB’s mobile source, fuels, and consumer products control programs, California’s vehicle inspection and maintenance program, and federal measures. California’s 1994 ozone SIP has been approved by the U.S. EPA (see the January 8, 1997, Federal Register notice: 62 FR 1150).

The SCM is consistent with the SIP, because the SCM will be available for adoption by nonattainment districts to help meet their SIP commitments under the Act. Following is a more detailed description of the district architectural coatings SIP commitments that are contained in the 1994 ozone SIP.

In the 1994 ozone SIP, five local air districts in four federal ozone nonattainment areas included control measure commitments to achieve additional VOC emission reductions from architectural coatings. These districts are SCAQMD, Ventura County Air Pollution Control District (VCAPCD), Yolo-Solano Air Quality Management District (YSAQMD), Placer County Air Pollution Control District (PCAPCD), and San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD). YSAQMD and PCAPCD are part of the same federal ozone nonattainment area, which is referred to as the Sacramento Metropolitan Nonattainment Area. Table IV-18 lists the emission reduction commitments for architectural coatings in the 1994 ozone SIP by district and by attainment year. Appendix G identifies the detailed emission reduction commitments by interim milestone years.

TABLE IV-18
1994 OZONE SIP COMMITMENTS FOR VOC EMISSION REDUCTIONS FROM ARCHITECTURAL COATINGS MEASURES

District	Attainment Year	Committed Emission Reductions in Attainment Year		Status of Rulemaking
		TPD	Percentage	
San Joaquin Valley*	1999	1.5	7	In progress
Placer County	2005	1.6	9	Adopted 1997
Yolo-Solano				In progress
Ventura County	2005	0.9	15	In progress
South Coast*	2010	62.3	75	Adopted Phases I & II

* The U.S EPA is in the process of reclassifying San Joaquin Valley as severe nonattainment with an attainment date of 2005.

Table IV-19 below shows that staff believes that the proposed SCM will achieve sufficient reductions when compared to the percentage emission reductions claimed by the San Joaquin Valley Unified, Ventura County, and Yolo-Solano districts in their 1994 ozone SIPs. In fact, the proposed SCM is expected to achieve about a 20 percent emission reduction, which is greater than any of the SIP commitments of these three districts. The mass emission reductions in some cases are less than those claimed in the 1994 ozone SIP (see Table IV-18), primarily because the architectural coatings emissions inventory used in the 1994 ozone SIP is larger than the 1998 survey data used to calculate emission reductions from this proposed SCM. The official ARB emission inventory for architectural coatings is in the process of being updated to reflect these new data. The values in Table IV-19 assume that the emissions from architectural coatings are approximately 100 TPD, on an annual average, statewide, not including emissions from thinning and clean-up (ARB, 1999). The emission reductions from the SCM are estimated to be ~~11~~ 10 TPD, in the non-SCAQMD portion of the State.

TABLE IV-19
COMPARISON OF ESTIMATED EMISSION REDUCTIONS FROM THE PROPOSED SCM AND THE 1994 OZONE SIP COMMITMENTS

District	District's percent of California's population (A)	District's architectural coatings inventory (100 TPD * A) = (B)	1994 SIP commitment reduction (C)	1994 SIP commitment reduction (B*C) ~~= (D)~~	District's percent of SCM reductions (A/55%)(100) (~~E~~D)	District's reduction from SCM (~~E~~D*~~11.3~~ 10.3 TPD)
San Joaquin Valley	9.3%	9.3 TPD	7%	0.7 TPD	16.9%	~~1.9~~ 1.7 TPD
Ventura	2.2%	2.2 TPD	15%	0.3 TPD	4.0%	~~0.5~~ 0.4 TPD
Yolo-Solano	0.8%	0.8 TPD	9%	0.1 TPD	1.5%	0.2 TPD

2. Consistency with District Plans under the California Clean Air Act

In addition to the federal planning requirements described above in subsection 1, the California Clean Air Act (CCAA) imposes a separate set of planning requirements on local air pollution control and air quality management districts (districts). The CCAA was enacted in 1988, and has the fundamental goal that all areas of California are to attain the State ambient air quality standards (State standards) by the earliest practicable date. The State standards are set by the ARB, and the State one-hour ozone standard is more stringent than the federal one-hour ozone standard. As specified in the CCAA, the ARB has designated areas of California to be in "attainment" or "nonattainment" for the State standards. Local districts that are nonattainment for the State standards are required by the CCAA to prepare plans, which must be designed to achieve and maintain the State standards by the earliest practicable date. In developing their plans, each district determines which measures are necessary to include, as well as the specific details of each included measure.

Of the 35 districts in California, 22 are nonattainment for the State one-hour ozone standard and have air quality planning responsibilities. Of the 22 nonattainment districts, all but ~~four~~ five already have an architectural coatings rule. These ~~four~~ five districts are the Glenn, San Luis Obispo, Shasta, and Tehama County districts, and the Yolo-Solano AQMD.

In many of the nonattainment districts, substantial additional emission reductions will be necessary in order to achieve and maintain the State ozone standard. The SCM is consistent with the district plans because, if needed, the SCM will be available for adoption by the above ~~four~~ five districts in order to reduce VOC emissions and attain or maintain the State ozone standard. The Yolo-Solano AQMD needs the SCM as part of its federal SIP commitment. The remaining ~~18~~ 16 districts (~~except for~~ not counting the SCAQMD, which has already adopted a rule that will achieve greater emission reductions than the SCM will achieve) could also revise their existing rules to be consistent with the SCM, in order to achieve greater emission reductions from the SCM's more stringent VOC limits.

3. Consistency with Area-Wide Waste Treatment and Water Quality Control Plans

The SCM is consistent with area-wide waste treatment and water quality control plans because implementation of the SCM on a statewide basis will not significantly affect the ability of POTWs to treat and handle wastewater.

4. Consistency with Regional Transportation Plans (RTPs)

The SCM is consistent with RTPs since no significant adverse impact to transportation/ circulation will result from the additional regulation of architectural coatings within each affected district. While industry has asserted that some traffic and congestion may be generated from the disposal of small quantities of architectural coatings due to shelf-life, pot-life, and freeze-thaw problems, any such effects would be negligible and would not create significant adverse impacts to transportation/circulation. Furthermore, since compliant low-VOC coatings have performance characteristics that are comparable to their higher-VOC counterparts, additional trips are not expected to result over and above current trips associated with conventional coatings.

5. Consistency with Regional Housing Allocation Plans

As explained earlier, implementation of the SCM will not create or cause the need for additional housing throughout California. Furthermore, the SCM will not affect how housing is planned or allocated in the various districts that could potentially adopt the SCM. Therefore, the SCM is considered to be consistent with regional allocation plans throughout California.

6. Consistency with Habitat Conservation Plans

Implementation of the SCM will not create or cause impacts to sensitive habitats of plants or animals because all activities will typically occur at construction, industrial, or commercial sites already in operation. No new development that could potentially adversely affect plant and animal life is anticipated. Therefore, the SCM is considered to be consistent with habitat conservation plans throughout California.

7. Consistency with Natural Community Conservation Plans

As explained earlier, implementation of the SCM will not create impacts to cultural resources throughout California. There are existing laws in place that are designed to protect and mitigate potential impacts to cultural resources. Should archaeological resources be found during the application of architectural coatings to newly constructed structures or existing structures, the application of such coatings would cease until a thorough archaeological assessment was conducted. Furthermore, in most cases, the application of architectural coatings would occur after construction where archaeological resources would already have been disturbed. Therefore, the SCM is considered to be consistent with natural community conservation plans throughout California.

8. Consistency with Regional Land Use Plans for the Protection of the Coastal Zone, Lake Tahoe Basin, San Francisco Bay, and Santa Monica Mountains

Implementation of the SCM is not anticipated to conflict with regional land use plans for the protection of the Coastal Zone, Lake Tahoe Basin, San Francisco Bay, or the Santa Monica Mountains for the following reasons. As mentioned above, all activities associated with the SCM will typically occur at construction, industrial, or commercial sites already in operation.

Coastal Zone. Implementation of the SCM is not anticipated to result in any new development on tidelands, submerged lands, or public trust lands. Implementation of the SCM is not expected to result in the discharge or disposal of any dredged material or any gaseous, liquid, solid, or thermal waste; the grading, removing, dredging, mining, or extraction of any materials; changes in the density or intensity of use of the land; changes in the intensity of use of water or access thereto; the construction, reconstruction, demolition, or removal of any structures; or the removal or harvesting of major vegetation.

Lake Tahoe Basin. Implementation of the SCM is not anticipated to exceed any established environmental threshold carrying capacity necessary to maintain significant scenic, recreational, educational, scientific, or natural value of the Region or to maintain public health and safety within the Region, including but not limited to standards for air quality, water quality, soil conservation, vegetation preservation, wildlife, fisheries, noise, recreation, and scenic resources.

San Francisco Bay. Implementation of the SCM is not anticipated to result in development or fill of open water and slough areas in the San Francisco Bay that would impact fish and wildlife; vegetation; water surface area and volume; marshes and mudflats; weather and air quality (from decreasing size of open water through filling and the smog-producing consequences of urban development); shell deposits; and fresh water inflow.

Santa Monica Mountains. Implementation of the SCM is not anticipated to result in any new development that would result in the irreplaceable loss of open space and recreational resources; or the physical and biological deterioration of air, land, and water systems; or that would adversely impact regional life-support systems including fish and wildlife, thereby being harmful to the needs of the present and future population of the region.

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V.

PROJECT ALTERNATIVES

A. INTRODUCTION

This ~~Draft~~ Final Program EIR provides a discussion of alternatives to the proposed project, as required by CEQA. Alternatives include measures for attaining the objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative. A “No Project” alternative must also be evaluated. The range of alternatives must be sufficient to permit a reasoned choice, but need not include every conceivable project alternative. CEQA Guidelines §15126.6(a) specifically notes that the range of alternatives required in a CEQA document is governed by a “rule of reason” and only necessitates that the CEQA document set forth those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision-making and meaningful public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative. ARB’s certified regulatory program does not impose any greater requirements for a discussion of project alternatives in an environmental assessment than is required for an EIR under CEQA.

A CEQA document should identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and explain the reasons underlying the lead agency’s determination (CEQA Guidelines §15126.6(a)). The NOP/IS prepared for the SCM included seven concepts that could possibly be further developed into project alternatives. These concepts, which were previously identified by industry representatives during an ARB public consultation meeting in August 1998, include a low vapor pressure exemption, performance-based standards, reactivity-based standards, product line averaging, regional regulation, seasonal regulation, and modification of the VOC content limits/final compliance deadlines. One of the concepts identified in the NOP/IS, product line averaging, is considered a feasible alternative but is not included in the SCM at this time. Following is a discussion of the various alternatives considered by the staff.

B. ALTERNATIVES REJECTED AS INFEASIBLE

Upon further consideration and evaluation, some of the project alternatives originally identified by industry and included in the NOP/IS have been determined to be infeasible as the basis for a specific project alternative. These concepts and the rationale for rejecting them as infeasible are discussed in the following subsections.

1. Performance-Based Standards

Members of industry originally raised the concept for a performance-based rule provision or project alternative. Rather than establish lower VOC content requirements for specified categories of coatings, this alternative would establish emission standards based on performance standards such as emissions per area covered or coating durability.

This alternative was rejected as infeasible because no consensus could be reached on how to create standards to cover the multitude of coatings formulations with varying performance characteristics. For example, there are different performance characteristics for different coatings with different end-uses. In addition, one manufacturer may believe that one particular performance characteristic is more important than a second characteristic, while a different manufacturer may believe that the second characteristic is more important. Alternatively, a third manufacturer may believe that an entirely different characteristic is the most important. Similarly, one manufacturer may believe that a particular “score”on one test is adequate, while another manufacturer may believe that a higher “score”is necessary. Agreement could not be reached concerning the appropriate standards for each type of coating technology. As a result, this alternative has been dropped from further consideration.

2. Seasonal Regulation

Under this alternative, the VOC content limits proposed for various coatings in the SCM would only be in effect during the “high ozone season” (typically the summer months). During the “low ozone season” (typically the winter months), coatings formulators could sell and distribute, and contractors and do-it-yourselfers could use, coatings with higher VOC contents.

ARB staff has determined that this alternative is infeasible because, as discussed below, it is too difficult to implement and enforce. Based on discussions with industry representatives, one problem is that it may be difficult for coatings formulators and distributors to manage architectural coatings stocks to ensure that only complying coatings are sold during the high ozone season. In addition, coatings are applied by thousands of individual painters, and it is simply not realistic to expect all of these individual applicators to know when it is “legal” to apply a particular can of paint, and when it is not. Contractors working on projects that span seasons could be put in jeopardy. Even for individuals who know what the rules are, there would be considerable incentive not to follow them in situations where a person already has in their possession a can of high-VOC paint that will do the job perfectly well, and the individual is faced with the prospect of taking the time to drive to a paint store and spend additional money to purchase complying low-VOC paint. Human nature being what it is, it is likely that many individuals would opt to use up the paint they have on hand, regardless of what the air quality rules may be. Finally, effective enforcement of such a rule at thousands of individual, constantly changing painting sites would be extremely difficult. Districts would have to commit significant additional enforcement resources, and many districts would simply not be able to do this.

In addition, VOC emissions contribute to year-round PM levels, and almost the entire State violates California’s PM_{10} standard.

For all of the reasons discussed above, the “Seasonal Regulation” alternative is not considered to be a feasible alternative.

3. Regional Regulation

Under this alternative, areas within each district that do not have an ozone problem or contribute to the district’s ozone problem would be exempted from the VOC content requirements of the SCM. This alternative was rejected as infeasible for the reasons specified below.

To determine the viability of such an approach, a district would have to undertake ambient air quality modeling (*e.g.*, urban airshed model (UAM)). However, this type of geographical shift alternative would be extremely difficult to model because the UAM is dependent on meteorological conditions. For example, depending on the meteorological conditions used, it would be difficult to determine whether or not an exceedance in one source receptor area (SRA) was due to the emissions sources in that SRA or the result of wind conditions in which emissions from an upwind SRA were transported to a second SRA, causing a violation in the second SRA.

Even if one could make a reliable technical determination that certain areas within a district could be exempted from VOC regulations without impacting air quality, there remains the very difficult problem of actually enforcing such a scheme. Architectural coatings are distributed from a large number of retail stores, and are used in thousands of individual locations throughout each district. A regional deregulation scheme might have to rely on maps or some other cumbersome system to depict which areas coatings could be used in, and which they could not. Such a system would have severe enforcement problems, for the same reasons discussed in the previous section on “Seasonal Regulation.”

In addition, VOC emissions contribute to year-round PM levels, and almost the entire State violates California’s PM_{10} standard.

For all of the reasons discussed above, the “Regional Regulation” alternative is not considered to be a feasible alternative.

4. Exceedance Fees

This alternative was not listed in the NOP as an alternative that would be discussed in the ~~Draft~~ Final Program EIR. However, staff decided to include a discussion in response to a comment on the NOP received from the National Paint & Coatings Association. The comment suggested that the Program EIR should explore an option to allow purchases of noncompliant coatings on payment of a fee, similar to the system that exists in the national AIM coatings rule.

The commenter is referring to the Exceedance Fees allowed by section 59.403 of the national AIM rule. This section basically allows coatings manufacturers and importers to sell coatings that exceed the applicable VOC limit in the AIM rule, if they pay a fee of $0.0028 per gram of excess VOC. Conceptually, such a fee is essentially a “pay-to-pollute” approach. The ARB has generally not supported such proposals in the past because they do nothing to bring the air into compliance with State and federal standards, and may actually hinder attainment efforts. The fundamental problem with allowing exceedance fees in the SCM is simply that such an approach could eliminate or substantially reduce the emission reductions expected from the SCM. In addition to this general problem with such proposals, the ARB staff is also concerned that the fee amount specified in the national AIM rule is not high enough to seriously discourage the manufacture and sale of high-VOC coatings. Finally, this approach would be difficult to enforce at a district-wide or statewide level, and would require extensive recordkeeping requirements. Because of these problems, an exceedance fee approach is not considered to be a feasible alternative.

5. Tonnage Exemption

This alternative was not listed in the NOP or the Draft Program EIR as an alternative that would be discussed in the Final Program EIR. However, staff has included a discussion of this alternative in the Final Program EIR because it is allowed by section 59.404 of the national AIM coatings rule. The tonnage exemption allows coatings manufacturers and importers to sell limited quantities of coatings that exceed the applicable VOC limit in the AIM rule, without paying an exceedance fee. The calculation is based on the total mass of VOC contained in all exempt coatings. The limit of the exemption, per manufacturer or importer, is on a sliding scale from 25 tons VOC beginning September 13, 1999 through December 31, 2000; 20 tons VOC in the year 2001; and 10 tons per year in 2002 and each subsequent year.

Like the exceedance fee, a tonnage exemption does nothing to bring the air into compliance with State and federal standards, and may actually hinder attainment efforts. Allowing a tonnage exemption in the SCM could substantially reduce the emission reductions expected from the SCM. California needs the emission reductions from the SCM, and fewer emission reductions will result if some manufacturers use the tonnage exemption instead of reformulating some of their coatings. Although the tonnage exemption was designed as a flexibility option for small companies, the recordkeeping and reporting requirements are substantial, and it is possible that only large companies would realistically have the resources to comply with these requirements. This approach would be difficult to enforce at a district-wide or statewide level. Finally, as discussed throughout the Final Program EIR, the ARB staff has concluded that the VOC limits in the SCM are feasible, and thus there is no technical need for a tonnage exemption. For these reasons, a tonnage exemption is not considered to be a feasible alternative.

~~5~~6. Low Vapor Pressure (Low Volatility) Exemption

Under this alternative, VOCs with low vapor pressures *(i.e.*, “low vapor pressure VOCs” or “LVP-VOCs”) would be exempted as VOCs in determining the overall VOC content of a coating. This alternative has been rejected as infeasible as described below.

a. Introduction

Volatility describes the tendency of a substance to evaporate and enter the atmosphere as a gas. Some compounds evaporate quickly (high volatility), while others volatilize slowly (low volatility). LVP-VOCs tend to volatize (*i.e.*, evaporate) into the atmosphere more slowly than non-LVP-VOCs. An exemption for low volatility compounds in paint would make sense if it could be shown that there exists some vapor pressure threshold, below which a compound would not be volatile enough to evaporate and enter the atmosphere.

EL RAP (1998) contends that because of their low rates of volatilization and other chemical and physical properties, certain VOCs used in architectural coatings either never enter the atmosphere at all or, if they do enter the atmosphere initially, these VOCs do not remain in the atmosphere long enough to participate in ozone formation. Instead, it is claimed that these compounds are removed from the air by absorption onto building surfaces, pavement, soil, or vegetation, or through atmospheric removal by interaction with water vapor, dust, or other particulate matter.

EL RAP maintains that a useful measure of atmospheric availability is volatility, measured by vapor pressure. California and national consumer products regulations exempt compounds with vapor pressure at or below 0.1 mm Hg at 20^{o} C. EL RAP claims that the ARB's and the U.S. EPA's reasoning for exempting such low volatility compounds from consumer products is that these "products often contain ingredients which are of extremely low volatility (*i.e.*, some ingredients evaporate at such a low rate that they do not enter the air to any appreciable degree)." EL RAP argues that because the consumer products regulations at the federal and state level have the exemption, therefore such an exemption should also be included in the SCM in order to achieve consistency with these regulations. The following cosolvents in waterborne latex coatings are named by EL RAP as low volatility compounds: ethylene glycol, propylene glycol, and Texanol® ester alcohol.

EL RAP argues that exempting these compounds from architectural coatings would reduce the emissions inventory for these coatings by about 30 percent. EL RAP maintains that an exemption would also provide formulation latitude necessary to continue developing high-performance waterborne coatings that would be required to sustain the market-driven conversion from solvent-borne to waterborne coatings. EL RAP concludes that this will result in reducing both emissions and potential ozone impacts.

The ARB staff has carefully evaluated all of these issues and concluded that it would not be appropriate to include an LVP-VOC exemption in the SCM. The reasons for this conclusion are discussed below.

b. An LVP-VOC Exemption Would Not Achieve Regulatory Consistency

i. LVP-VOCs in the ARB Consumer Products Regulations and the U.S. EPA Consumer Products Regulation

The ARB Regulation for Reducing the Volatile Organic Compound (VOC) Emissions from Consumer Products (the "ARB consumer products regulation": title 17, CCR, sections 94507-94517) contains an exemption for LVP-VOCs (see title 17, CCR, section 94510(d)). The Board first approved this exemption in 1990. As originally adopted, the exemption applied to any VOC which: (a) has a vapor pressure less than 0.1 mm Hg at 20^{o} C, or (b) consists of more than 12 carbon atoms, if the vapor pressure is unknown.

It should be noted that in 1990, the original exemption was commonly referred to as the "low vapor pressure" or "LVP" exemption, but the terms "low vapor pressure" or "LVP" did not appear in the actual language of the consumer products regulation. The regulation was subsequently amended to add the term "LVP-VOC" to describe the compounds that were covered by the exemption.

On November 16, 1999, a number of modifications to the original definition went into effect. The definition of LVP-VOC was changed because the ARB developed a feasible and enforceable test method to determine LVP-VOCs in consumer products. The modified definition is as follows:

> LVP-VOC means a chemical "compound" or "mixture" which contains at least one carbon atom and meets one of the following:
>
> (A) a vapor pressure less than 0.1 mm Hg at 20° C, as determined by ARB Method 310, or
> (B) is a chemical "compound" with more than 12 carbon atoms, or a chemical "mixture" comprised solely of_"compounds" with more than 12 carbon atoms, and the vapor pressure is unknown; or
> (C) is a chemical "compound" with a boiling point greater than 216° C, as determined by ARB Method 310; or
> (D) is the weight percent of a chemical "mixture" that boils above 216° C, as determined by ARB Method 310.
>
> For the purposes of the definition of LVP-VOC, chemical "compound" means a molecule of definite chemical formula and isomeric structure, and chemical "mixture" means a substrate comprised of two or more chemical "compounds" (see title 17, CCR, section 94508).

The U.S. EPA has also adopted a consumer products regulation which contains an LVP-VOC exemption. The U.S. EPA's regulation, which was promulgated on September 10, 1998, was closely modeled after an earlier version of the ARB consumer products regulation (first approved by the ARB in 1990). Accordingly, the U.S. EPA's consumer products rule contains an LVP-VOC exemption that is similar to the earlier version of the ARB's LVP-VOC definition that is set forth above (see 40 CFR Part 59, Subpart C, Section 59.203(f).

The U.S. EPA does not support an LVP-VOC exemption for architectural coatings. The U.S. EPA believes that, because Method 24 is available to measure the VOC content of architectural coatings, this method accounts for the volatility of solvents. Solvents that do not volatilize under Method 24 are not measured as VOC. Further, based on U.S. EPA indoor air studies cited below, the U.S. EPA maintains that virtually 100 percent of the VOC in paint is eventually emitted and is available to form ozone (U.S. EPA, 1998). In the preamble to the proposed national consumer products rule, the U.S. EPA states that, although a low volatility cutoff for consumer products was being proposed, this in no way alters the U.S. EPA's existing overall VOC policy, and does not set a precedent for other rules (U.S. EPA, 1996; see 61 FR 14535; April 2, 1996). Finally, U.S. EPA's long-standing reactivity policy is that a 0.1 mm Hg vapor pressure cutoff cannot be used in a VOC definition because this would exempt compounds of low volatility. This is because these low volatility compounds, under certain processes, would volatilize and participate in photochemical reactions (U.S. EPA, 1988).

ii. LVP-VOCs are not Exempted in the Architectural Coatings and Aerosol Paint Regulations

Although the ARB and the U.S. EPA consumer products regulations contain an LVP-VOC exemption, no similar exemption is contained in *any* of the current rules for architectural coatings or aerosol paints. The U.S. EPA has promulgated a final rule for architectural coatings which does not include an exemption for LVP-VOCs (see 63 FR 48848; September 11, 1998). Architectural coatings have also been regulated for many years in California by the local air pollution control and air quality management districts (districts). Seventeen districts currently have architectural coatings rules, and none of these rules contain an LVP-VOC exemption. The ARB has also adopted a regulation to regulate the VOC content in aerosol coating products (*i.e.*, “spray paint”; see title 17, CCR, section 94540 to 94555), and this regulation also does not contain an exemption for LVP-VOCs. In fact, ARB staff is not aware of any architectural coatings or aerosol paint regulation anywhere in the United States that contains an LVP-VOC exemption.

From the above discussion, it is apparent that including an LVP-VOC exemption in the architectural coatings SCM would not achieve regulatory consistency, because other regulations relating to architectural coatings and aerosol paint do not have such an exemption. The obvious question, however, is why this is so when the ARB and U.S. EPA consumer products regulations *do* have an LVP-VOC exemption. The short answer is that there are important differences between these types of regulations that justify different treatment for LVP-VOCs. These differences are explained in the following sections.

c. The History and Rationale for the LVP-VOC Exemption in the ARB Consumer Products Regulation

The current ARB consumer products regulation was adopted in several regulatory phases. After approval by the State Office of Administrative Law, the first phase (Phase I) became legally effective on October 21, 1991, and the second phase (Phase II) became legally effective on January 6, 1993. The LVP exemption was adopted as part of the Phase I regulatory action. A staff report, technical support document, and final statement of reasons were prepared for both Phase I and Phase II, and these rulemaking documents describe the purpose of the LVP-VOC exemption.

Basically, the LVP-VOC exemption was designed to account for the fact that in *some* product formulations, under certain conditions of use, some VOCs will evaporate very slowly or not at all due to low vapor pressures. Such low vapor pressure (LVP) compounds were described in the Phase I rulemaking record as less “emissive” than compounds with higher volatility. This means that in certain consumer products, due to the particular product formulation characteristics, some portion of the LVP compounds do not volatilize quickly enough to be emitted into the atmosphere under normal conditions of use. Compounds that are not emitted into the atmosphere (*i.e.*, do not evaporate) are of course not available to react in the atmosphere to form ozone. ARB staff recognized that whether or not a compound is emitted into the atmosphere is critically dependent not only on the vapor pressure of the individual compound, but also on: (1) the type of product in which the compound is used, (2) the particular characteristics of the product's formulation, and (3) the way in which the product is actually used by consumers in the real world.

The staff reports and technical support documents cite some examples of products that contain LVP-VOC compounds. Examples that were cited are the high molecular weight resins used in hair sprays and floor polishes, the surfactants used in cleaners, and the heavy oils used in furniture polishes. For these products, it was clear to ARB staff that, while some portion of these LVP-VOCs would eventually evaporate and enter the atmosphere, some portion of these compounds would never evaporate. This can be illustrated by the example of the surfactants used in general purpose cleaners and bathroom and tile cleaners. The surfactants in these products are typically composed of LVP-VOCs. In normal use when such cleaners are used to wash surfaces, some of the more volatile VOCs in the cleaner quickly evaporate into the air, but some of the slower-evaporating VOCs (such as surfactants) are typically washed "down-the-drain" and into the sewer system. Once in the sewer system, scientific studies have demonstrated that some of the remaining VOCs will eventually leave the sewer system and enter the atmosphere through various mechanisms, such as: (1) stripping into the air during sparging and aeration caused by turbulence in the sewer system, or (2) adsorption onto wastewater solids and subsequent offgassing during dewatering and landfilling of those solids. However, these studies also demonstrate that a substantial proportion of the "down-the-drain" VOCs will never be emitted, because these VOCs will biodegrade in the sewer system before significant amounts of the VOCs can evaporate and enter the atmosphere.

Based on this research, ARB staff recognized that LVP-VOCs do contribute to ozone formation in the atmosphere, but that since some portion of LVP-VOCs in some consumer products will not be emitted from certain product formulations, LVP-VOCs as a class will contribute *less* to ozone formation than higher-volatility VOCs in certain product categories. ARB staff also wanted to streamline the regulatory development of the consumer products regulation, minimize the impacts on industry, and provide formulation flexibility to manufacturers. It was felt that all of these goals could be accomplished by including the LVP-VOC exemption in the consumer products regulation, and thereby concentrate the regulatory effort on the higher volatility VOCs that were of the most concern for air quality. The language of the LVP-VOC exemption was designed to provide a simple way to distinguish the compounds that were of less regulatory concern, and were thus to be exempted for those product categories regulated under the Consumer Products Regulation. The LVP language incorporated a vapor pressure "cutoff" of 0.1 mm Hg (at 20^{o}C) because that number was the limit of instrument detection at the time. However, it should be noted that the vast majority of LVP-VOCs staff was aware of during the Phase I and II rule development had vapor pressures that were much lower than 0.1 mm Hg (calculated).

When Phase I and Phase II were developed, ARB staff believed that the LVP exemption would be used only for the very limited number of LVP compounds that were being used in certain categories of consumer products in the early 1990s. For example, the waxes, resins and other solids in existing products would continue to be used in reformulated products. Staff did not anticipate that the consumer products industry would develop new solvents (*i.e.*, certain liquid hydrocarbon distillate mixtures) that would technically be able to qualify for the LVP exemption. In consumer products, solvents are used primarily to dissolve, or act as a carrier for, the active ingredient. In some products, such as brake cleaners, the solvent can be the active ingredient. The LVP exemption was not originally designed to provide an exemption for solvents used in consumer products. It was also not designed to apply to the solvents used in architectural coatings (which were specifically excluded from the definition of "consumer products" under Health and Safety Code section 41712). At the time, the ARB staff was not aware of any LVP compounds that functioned as a solvent, and were being used in the product formulations proposed for regulation under the Consumer Products Regulation.

After Phase I and Phase II became legally effective, ARB staff learned that new solvents claiming LVP status, such as hydrocarbon distillate mixtures, had been developed and were being used by consumer products manufacturers in some reformulated products. Hydrocarbon distillate mixtures are typically mixtures containing dozens to hundreds of compounds that cannot be easily separated into individual pure compounds and allow for testing of the vapor pressure of the individual compounds. These solvents are being used to replace some of the regulated VOC solvents in products, in order to take advantage of the LVP exemption and meet the VOC standards in the ARB Consumer Products Regulation. In fact, the ARB plans to include the emissions from these hydrocarbon distillate mixtures in the updated consumer products inventory.

LVP-VOC solvents are very different from many other types of LVP-VOCs, many of which are waxy solids at room temperature. ARB staff expects that all or nearly all of these LVP solvents used in consumer products will volatilize, enter the atmosphere, and be available to participate in photochemical reactions leading to the formation of ozone. A contact at the U.S. EPA's Air and Energy Engineering Research Laboratory (Sparks, 1991) believes that all the VOC emissions from consumer products reach the outdoors via air exchange. In certain studies where known emissions of VOCs from certain consumer products are allowed to enter a room, although some VOCs attach to surfaces, they are eventually re-emitted. Further, the concentrations in indoor air decay over time as the emissions are removed via air exchange. Further discussion of these indoor "sink" effects can be found in section e, below.

Although the LVP-VOC exemption was designed in part to account for the lesser volatility of LVP compounds, the LVP-VOC exemption does not have anything to do with the potential reactivity of LVP-VOCs once they have evaporated and entered the atmosphere. The reactivity of VOCs is a separate concept from a compound's volatility. While "volatility" describes a compound's tendency to evaporate and enter the atmosphere as a gas, a compound's "reactivity" refers to the compound's tendency to react with other compounds to form ozone, once the compound has entered the atmosphere and is available to participate in ozone-forming reactions. In the ARB Consumer Products Regulation, the definition of the term "VOC" (in section 94508, title 17, CCR) specifically excludes compounds that do not react to form ozone in the atmosphere, or have low reactivity. This exemption in the VOC definition—not the LVP-VOC exemption—is how the regulation excludes compounds that are non-reactive or low in reactivity, and thus do not need to be regulated to order to reduce ozone.

d. LVP-VOCs Used in Architectural Coatings

Some ingredients found in architectural coatings meet the definition of an LVP-VOC, as that term is defined in the ARB consumer products regulation. Before proceeding further, it is useful to identify the specific compounds used in architectural coatings that meet the definition of a LVP-VOC, and would therefore be excluded from regulation if an LVP-VOC exemption were to become part of the SCM.

There are three general categories of compounds found in architectural coatings: resins, pigments, and solvents. Typically, some of the compounds in each category are LVP-VOCs, and some compounds are non-LVP-VOCs. For example, most of the pigments are solid material that qualify as LVP-VOCs and should not evaporate under Method 24 (as explained in section f, below.) Some of the solvents are LVP-VOCs, and others are non- LVP-VOCs. Table V-1 below lists a few of the solvents listed in the ARB survey (ARB, 1999c) that ARB staff believes would qualify as LVP-VOCs, with their relative rank in overall ingredients in waterborne architectural coatings.

Total use of these compounds is reported at more than 21 million pounds, or about five percent of the reported ingredients, excluding water, used in waterborne coatings. The point is, by requesting an LVP-VOC exemption for architectural coatings, manufacturers are requesting an exemption for a large volume of solvents that are used extensively in architectural coatings. In fact, as mentioned above, EL RAP believes that an LVP-VOC exemption would cover 30 percent of the solvents used in architectural coatings. So if an exemption were granted for LVP-VOCs, the negative impact on air quality could be severe if any significant amount of these LVP-VOCs would enter the atmosphere and participate in photochemical ozone reactions.

TABLE V-1
LVP-VOC SOLVENTS IN ARB ARCHITECTURAL COATINGS SURVEY

Compound	Rank in Waterborne Coatings
2,2,4-trimethyl-1,3-pentanediol isobutyrate (Texanol®)	6
Propylene glycol	8
Ethylene glycol	9
2-(2-butoxyethoxy)ethanol	14

e. LVP-VOC s in Architectural Coatings Will Evaporate and Become Available to Form Ozone in the Atmosphere

The ARB staff has carefully examined the issue of whether LVP-VOCs used in architectural coatings will evaporate into the atmosphere and become available to form ozone. As part of this evaluation, staff reviewed a number of indoor air quality studies, which are listed as references at the end of this section. Staff's conclusion is that all or almost all of the LVP-VOCs contained in architectural coatings do eventually volatize and enter the atmosphere, although in some situations it may take several years for this volatilization to be completed. Furthermore, once these compound initially enter the atmosphere, they may be temporarily adsorbed onto other materials (known as “sinks”), but these VOCs are subsequently desorbed and transported through air exchange into the ambient air.

Before getting into the more technical aspects of air pollution and coatings chemistry, it is useful to consider the issue of LVP-VOCs from a common sense perspective. As mentioned above in section c, in developing the consumer products regulation the ARB staff recognized that whether or not a compound is emitted into the atmosphere is critically dependent not only on the vapor pressure of the individual compound, but also on: (1) the type of product in which the compound is used, (2) the particular characteristics of the product’s formulation, and (3) the way in which the product is actually used by consumers in the real world.

In the case of architectural coatings, these products are designed to be spread as a thin film across walls and other surfaces, and then allowed to completely dry in the air. Basically, the way most coatings work is that the solvent in the coating evaporates and leaves behind the other constituents of the coating (*e.g.*, resins and pigment) as a film on the surface. If the solvent did *not* evaporate, the paint would not dry. (This is not true of all coatings, of course. There are a few types of coatings that do not evaporate when they dry: 100 percent solids traffic paints and two-component industrial maintenance coatings, for example, which are either melted as they are applied, or form a film by chemical reaction, respectively.)

Because of this way that architectural coatings are formulated and used, an LVP-VOC exemption for paints is a totally different technical issue than an LVP-VOC exemption for consumer products. Almost all types of paint are designed to stay on a surface for years without being washed off, whereas many consumer products have very different formulation and usage characteristics (such as “down-the-drain” effects). It is a matter of common sense that solvents used in paint, whether these solvents are LVP-VOCs or non-LVP-VOCs are very likely to evaporate and enter the atmosphere.

This common sense conclusion is supported by the various indoor air quality studies considered by ARB staff (Chang et al, 1997; Chang et al, 1998; Clausen, 1993; Clausen et al, 1991; Censullo et al, 1996; Hodgson, 1999; Tichenor et al, 1991; and Von Der Wal et al, 1997). Some of the LVP compounds in latex paint have been studied indirectly as part of these indoor air quality studies. The most common compounds found in studies of latex paint are propylene glycol, ethylene glycol, and Texanol®. These compounds have different roles in the coatings. For example, Texanol® and 2-(2-butoxyethoxy)ethanol are generally used as coalescing aids, which helps the latex emulsion form a film. Texanol® is water insoluble and is usually added to coatings because it does not immediately evaporate with the water and other water-soluble ingredients. Rather, it temporarily remains associated with the latex particles, softening them and helping them fuse as the paint dries. Propylene glycol and ethylene glycol are typically used in latex paints to help painters maintain a wet edge and to protect the latex paint from freezing. Propylene glycol and ethylene glycol, and 2-(2-butoxyethoxy)ethanol are water soluble, and thus are associated with the aqueous portion of the paint (Dow, undated; Eastman, undated).

In general, the research shows that very significant amounts of these compounds are emitted from coatings as the coatings dry. The rate at which the compounds are emitted appears to depend on a variety of factors, such as the temperature and the substrate to which the coatings are applied. The studies show that for some substrates such as metal, virtually all of the low volatility compounds are emitted completely in a matter of days or weeks**.** For other more absorbent substrates such as drywall, some percentage of the compounds are emitted in a few days or weeks, but the remainder of the other compounds are emitted much more slowly, and it may take from one to three-and-one-half years before all or almost all of the VOCs are emitted. The studies do not conclusively answer the question of whether 100 percent of these compounds are eventually emitted from paint, but they do clearly demonstrate that very significant amounts of LVP-VOCs are emitted over time, and many researchers believe that virtually all of these compounds are eventually emitted.

Once VOCs are emitted into the air from a coating, some of the emitted VOCs may then be adsorbed onto surfaces, or sinks. Some common indoor sinks include walls, carpets, and furniture. Studies have shown that under certain conditions, some percentage of the VOCs (including LVP-VOCs) found in the air of a test chamber can be adsorbed into sinks, but also that VOCs adsorbed by sinks are eventually re-emitted (*i.e.*, desorbed). As with the issue of whether 100 percent of VOCs eventually evaporate from a newly-painted surface, the studies do not conclusively answer the question of whether 100 percent of the VOCs adsorbed by sinks are eventually re-emitted, but they do clearly demonstrate that very significant amounts of VOCs are desorbed over time. Depending on the type of VOC, the type of sink, the ventilation rate, and various other factors, the desorption time varies, and may be as long as several years for some percentage of the adsorbed VOCs. After desorption has occurred, volatile organic vapors are available for transport to the ambient air via air exchange.

f. U.S. EPA's Test Method 24 Automatically Excludes VOCs That Do Not Evaporate into the Atmosphere

Pigments and resins contained in architectural coatings are left behind on the painted surface as a film after the coating dries. Since many pigments and resins are LVP-VOCs, one might expect that these compounds should receive an exemption. However, the test method for architectural coatings automatically excludes from regulation all VOCs that do not evaporate, thereby rendering it unnecessary to include a special exemption for LVP-VOCs.

The specified test method for measuring the VOC content of architectural coatings has been U.S. EPA's Method 24 (40 CFR, Part 60, Appendix A). First adopted in October 1980, Method 24 has gone through extensive peer-review by industry and government agencies, and is the test method used to enforce the local district rules in California, as well as the U.S. EPA's National Rule for architectural coatings (see 40 CFR Part 60, Appendix A).

Method 24 defines the VOC content in the product. In this test, a sample of paint is held at 110^{o} C for 1 hour. During Method 24 testing of paints, many compounds with vapor pressures less than 0.1 mm Hg at 20^{o} C volatilize, and thus are considered VOCs. Because the sample is weighed before and after this procedure, with the difference in weight representing the weight of the volatile compounds that have evaporated, only those compounds that have evaporated are counted as VOCs for the purposes of determining the sample's VOC content.

Actually, the description in the previous paragraph is an oversimplification, because only some of the volatile compounds are ultimately counted as VOCs under Method 24. The test described above will measure the total “volatile matter content” of the sample. “Volatile matter content” encompasses all compounds that have evaporated during the test, including water and other “unreactive” compounds that are exempt from regulation as VOCs because they have minimal potential to react in the atmosphere to form ozone. To eliminate water and these other compounds from being counted as VOCs, Method 24 specifies that various other tests be performed to identify and subtract these compounds from the final determination of a product’s VOC content. The portion of the sample that does not evaporate (*e.g.*, pigment and binder) is not counted as a VOC.

What this means is that, for whatever portion of the compounds in paint (pigments or resins) that do not evaporate and remain in the film (whether that portion consists of LVP-VOCs, non-LVP-VOCs, or non-VOCs), Method 24 will automatically exclude that portion from regulation by not counting the excluded material as a VOC. It is simply unnecessary to provide any additional exemption for LVP-VOCs in paint, beyond what is automatically provided by Method 24.

g. Conclusion

For the reasons discussed above, the ARB staff concluded that it is would not be appropriate to include an LVP-VOC exemption in the SCM, and this alternative is not considered to be a feasible alternative.

~~6~~7. Reactivity-based VOC Limits

Some industry representatives have suggested that, rather than mandating mass-based VOC limits, the ARB should establish reactivity-based VOC limits for architectural coatings. They claim that mass-based controls are not effective and that reactivity-based limits are the only approach to ensure that reformulated products all have equal ozone impacts. Industry also believes that a reactivity-based control strategy is more cost effective than mass-based controls. Therefore, the alternative would be to establish an SCM with reactivity-based VOC limits instead of mass-based VOC limits.

a. Background on VOC Photochemical Reactivity

As part of California’s strategy to reduce excess ozone concentrations in non-attainment areas, control of volatile organic compounds (VOCs) is important, particularly in areas rich in ambient concentrations of nitrogen oxides (NO_x), such as urban centers. Control of VOCs has been accomplished traditionally through mass-based reductions. However, since different VOCs react via different chemical mechanisms, different VOCs will have different impacts on ozone formation. This is the principle behind VOC photochemical reactivity (reactivity). In other words, the difference in the chemistry of each VOC, or its reactivity, needs to be considered in the assessment of its impact on ozone formation. Reactivity values allow relative comparisons and assessments of VOCs’ ozone formation potentials to be used for regulatory purposes. A general discussion of the chemistry of ozone formation and reactivity issues can be found in the More Reactivity section in Chapter IV.

b. ARB's Plans to Evaluate Reactivity-Based Control Strategies

The ARB is committed to evaluating the feasibility of reactivity-based regulations for certain source categories, including architectural coatings, to determine if, in the future, reactivity-based controls could be developed. As evidence of the Board's commitment, the ARB has funded research projects to improve and refine the science of VOC photochemical reactivity. A partial listing of reactivity research funded by ARB is shown below:

- DEVELOPMENT OF REACTIVITY SCALES VIA 3-D GRID MODELING OF CALIFORNIA OZONE EPISODES. 98-309: University of California, Berkeley.

- IMPROVEMENT OF SPECIATION PROFILES FOR AEROSOL COATINGS. 98-306: California Polytechnic State University Foundation, San Luis Obispo.

- LINKAGES BETWEEN MEASUREMENTS OF MULTIFUNCTIONAL AND POLAR ORGANICS IN CHAMBER STUDIES AND THE AMBIENT ENVIRONMENT. 98-311: University of California, Davis.

- ATMOSPHERIC CHEMISTRY OF SELECTED LINEAR, BRANCHED, AND CYCLIC C_{10} ALKANE COMPONENTS OF MINERAL SPIRITS. 97-312: University of California, Riverside.

- DEVELOPMENT AND APPLICATION OF IMPROVED METHODS FOR MEASUREMENT OF OZONE FORMATION POTENTIALS OF VOLATILE ORGANIC COMPOUNDS. 97-314: University of California, Riverside.

- UNCERTAINTY ANALYSES OF CHEMICAL MECHANISMS DERIVED FROM ENVIRONMENTAL CHAMBER DATA. 95-331: University of California, Riverside.
- INVESTIGATION OF ATMOSPHERIC REACTIVITIES OF SELECTED STATIONARY SOURCE VOCs. 95-308: University of California, Riverside.

- DEVELOPMENT AND APPLICATION OF AN UPDATED PHOTOCHEMICAL MECHANISM FOR VOC REACTIVITY ASSESSMENT. 92-329: University of California, Riverside.

- PRODUCT STUDIES OF THE ATMOSPHERICALLY IMPORTANT REACTIONS OF ALKENES AND AROMATIC HYDROCARBONS. 94-311: Statewide Air Pollution Research Center, University of California, Riverside.

- EXPERIMENTAL STUDIES OF ATMOSPHERIC REACTIVITIES OF VOLATILE ORGANIC COMPOUNDS. AO32-096: University of California, Riverside.

- EXPERIMENTAL INVESTIGATION OF THE ATMOSPHERIC CHEMISTRY OF AROMATIC HYDRCARBONS AND LONG-CHAIN ALKANES. A032-067: University of California, Riverside.

- DEVELOPMENT AND APPLICATION OF AN UP-TO-DATE PHOTOCHEMICAL MECHANISM FOR AIRSHED MODELING AND REACTIVITY ASSESSMENTS. A932-094: University of California, Riverside.

- REVIEW OF THE UPDATED MAXIMUM INCREMENTAL REACTIVITY SCALE OF DR. WILLIAM CARTER. 98-401: Desert Research Institute; Reno, Nevada.

In addition to funding research, in 1996 the Chairman of the ARB established the Reactivity Scientific Advisory Committee (RSAC) to advise the ARB on the science of reactivity. The RSAC is an independent panel of scientists with various areas of expertise in the field of atmospheric chemistry. The RSAC has met four times.

Another advisory group, the Reactivity Research Advisory Committee (RRAC), has also been formed. The RRAC is comprised of consumer product manufacturers, raw material suppliers, and other interested stakeholders. The purpose of the RRAC has been to identify important VOCs used in consumer products that warrant further reactivity characterization. The goal has been to ensure that reactivity regulations being developed for consumer products are based on sound VOC reactivity data. This group has met seven times and has provided valuable input on commercially important VOCs to study further to reliably assess their reactivity. Based on their suggestions, additional research was funded by ARB and completed (see above contract # 95-308) (ARB, 1998a; 2000).

i. Use of reactivity in current regulations

The research funded by the ARB has led to incorporation of VOC reactivity into regulatory strategies. In fact, the ARB was the first regulatory agency to enact a regulation which uses reactivity in a more complex manner than U.S. EPA's "bright-line" approach in their VOC exemption process (ARB, 1990).

The Low Emission Vehicle/Clean Fuels (LEV/CF) Regulations established increasingly stringent standards for emissions of nonmethane organic gases (NMOG), NO_x, carbon monoxide, and formaldehyde. As part of the regulation, to encourage use of alternatively fueled vehicles (AFV), the ARB established a process to account for the differences in reactivity of the NMOG emissions. The regulation allows AFVs to have a higher mass of NMOG emissions as long as the ozone formation potential of the AFV emissions are no more than those of a conventionally fueled vehicle (CFV). Emissions are compared through the use of reactivity adjustment factors (RAFs). A RAF is defined as the ratio of the exhaust reactivity (per gram) of an AFV to the exhaust reactivity of a comparable CFV. For an AFV, the mass emission rates of NMOG exhaust are adjusted by the RAF prior to comparison with the emission standards specified in the regulation (ARB, 1990).

It is important to note that to calculate RAFs, the speciated inventory that contributes to ozone formation must be identified and quantified. The LEV/CF Regulations also established the Maximum Incremental Reactivity (MIR) scale as the most appropriate for use in our regulations. To determine the reactivity of exhaust, the emission rate of each NMOG species is converted to mass of ozone using the MIR scale. These are then summed to estimate the reactivity of the entire exhaust sample (ARB, 1990).

ii. Use of Reactivity in Future Regulations

The ARB has adopted an aerosol coatings regulation (title 17, CCR, sections 94520-94528) (ARB, 1999a) that limits the total VOC content of aerosol coatings on a percent-by-weight basis. This regulation, as with all mass-based VOC regulations, does not consider the different reactivities of the VOC ingredients in the product, other than by exempting VOCs that are very low in reactivity. However, as industry has indicated, and as discussed above in section "a" of part 6 of this Chapter, VOCs can differ significantly in their effects on ozone formation (Carter, 1994). Recognizing this concept, as a compliance alternative to this mass-based VOC regulation, ARB staff is developing a voluntary reactivity-based regulation for aerosol coatings for the Board's consideration during 2000. This proposed regulation would limit the total ozone formation potential (*i.e.*, reactivity), rather than the total mass of VOCs in a product.

Developing a reactivity-based regulation for chemically formulated products presents new challenges. For a given consumer products category, such as aerosol coatings, over 100 different VOC ingredients are used in formulations. It is also known that not all VOCs have been thoroughly studied to accurately assess their reactivity (Carter, 1999b). Therefore, to develop a successful reactivity program for chemically formulated products requires the following elements:

1) an inventory of completely speciated VOC data for individual products within the source category;
2) a scale that allows a comparison of VOC reactivities based on appropriate atmospheric conditions;
3) an inventory that consists largely of VOCs that have well-characterized reactivities;
4) product sales data that allow weighting of VOC reactivities; and,
5) a method to establish limits.

The aerosol coatings category was selected for development of the first consumer product reactivity-based regulation because the above elements are available. A recent survey provided detailed speciated VOC data and sales information. A review of the aerosol coatings data also showed that, on a mass basis, over 90 percent by weight of VOCs reported have been sufficiently studied to allow reliable MIR estimates. These estimates are derived from the MIR scale which was deemed by Dr. Carter to be the most appropriate reactivity scale for use in California (Carter, 1994). The methodology used to calculate reactivity limits is being designed such that the limits will provide equivalent ozone reductions as would be achieved through compliance with the mass-based VOC limits.

ARB staff intends to use this proposed regulation as a pilot project for determining the feasibility of additional reactivity-based regulations.

iii. Reactivity Regulation for Architectural Coatings

As stated above, industry has suggested that reactivity-based limits should be established for architectural coatings (EL RAP, 1998). The ARB believes this may be a viable alternative control strategy in the future for architectural coatings, and we have committed to investigate the feasibility of developing a reactivity-based strategy. The commitment to reactivity-based control strategies is further demonstrated by the proposed reactivity-based regulation for aerosol coatings. However, at this time, a number of issues need to be addressed before this type of control strategy could be developed for architectural coatings.

First of all, one requirement for accurately assessing the reactivity of products and establishing limits is an inventory of fully speciated VOC data for each product. Only with these data can the ozone formation potential be reliably assessed. Although the architectural coatings industry completed a survey in 1998 for their sales and VOC content in 1996, the data provided are not sufficient to establish the total ozone formation potential of the products (ARB, 1999c). It should be further noted that as the survey was being developed in conjunction with industry, there was reluctance to provide the level of detailed VOC speciation that is required for a reactivity program to be viable.

Additionally, some VOCs which are used extensively in architectural coatings do not have well-established reactivity values. A further complication is that some of the VOCs needing further characterization are not easily evaluated using present methodologies (smog chamber experiments) (Carter, 1999b). These VOCs are sometimes referred to as “sticky VOCs” in that, in a chamber, they are difficult to keep in the gas phase, and tend to stick to chamber walls (Carter, 1999b). However, the ARB is taking steps to address both of these issues. First of all, funding has been earmarked for future studies to help elucidate the mechanism by which the VOCs react in the atmosphere to produce ozone (ARB, 1999c). Data results and the knowledge obtained from these experiments can then be used to reliably estimate the reactivity of these VOCs such that MIR values are more certain. To address the issue of “sticky VOCs,” the ARB is funding research for development of an improved methodology to assess reactivity of VOCs (Carter, 1999b).

In the EL RAP concept paper it is acknowledged that not all VOCs used in architectural coatings have been thoroughly studied to reliably assess their reactivity. It is suggested that, in instances where a reactivity value is unknown, that a reactivity adjustment factor of “one” be used (EL RAP, 1998). The ARB disagrees with the approach of using a comparatively low “default” value. As evidence, using the MIR scale as the basis, reactivities of VOCs can vary by more than an order of magnitude (Carter, 1999a). Even the EL RAP paper acknowledges that a coating formulated with an equal amount of xylenes can potentially produce more than ten times the ozone as one formulated with mineral spirits (EL RAP, 1998). Given this wide range in reactivity, it would be unwise and not protective of air quality to use a low default value. To ensure that a regulation is based on sound science, the ARB believes that these reactivity estimates themselves should be based on the science rather than an arbitrary default value with no scientific basis.

c. Selection of an Appropriate Scale to Compare VOC Reactivities

At a public consultation meeting on May 27, 1998, industry suggested that the MIR scale may not be the most appropriate way to determine the reactivity of architectural coatings. This is because, they contend, the MIR scale depicts conditions when a change in VOC emissions will have the greatest impact on ozone concentrations.

It is true that the MIR scale is designed for conditions where changes in VOC concentration have the greatest impact on ozone concentration. However, before addressing industry's concern, some background on the development of scales to compare VOC reactivities is appropriate. When considering regulatory control of VOCs using the concept of VOC photochemical reactivity, it is important to assess and to attempt to quantify the impact of each VOC on ozone formation. One tool that allows for ozone measurement is a reactivity scale. Many scales have been proposed to quantify the ozone formation potential of VOCs. The complexity of these scales range from one considering only the hydroxyl-radical (OH) reaction rate constant (see, for example, Darnall *et al.*, 1976) to those that incorporate detailed effects of ozone chemistry and ambient conditions using the box model or the more sophisticated three-dimensional Eulerian model.

The MIR, Maximum Ozone Incremental Reactivity (MOIR), and Equal Benefits Incremental Reactivity (EBIR) are three incremental reactivity scales developed from box models of 39 U.S. urban areas (selection based on conditions described by the U.S. EPA) (Bauges, 1990; Carter, 1994). Incremental reactivity is expressed as the number of additional grams of ozone formed per gram of VOC compound added to the base organic mixture. For the purpose of ozone control, incremental reactivity is used to conveniently compute the ozone formation potential of a VOC when it is readily available for reaction in the troposphere. The MIR is the incremental reactivity computed for conditions in which the NO_x concentration would maximize the VOC reactivity. The scenario is typical in air parcels of low VOC-to-NO_x ratios, or air parcels in which ozone is most sensitive to VOC changes. These are typical of urban centers in which there are high emissions of NO_x and which the chemistry is VOC-limited. The MOIR is the incremental reactivity computed for conditions that maximize the ozone concentration. The scenario is characterized by moderate VOC-to-NO_x ratios such that the highest ozone concentration is formed. These moderate VOC-to-NO_x ratios are generally encountered as the chemistry is in transition between VOC and NO_x limitations. In this scenario, ozone formation is relatively insensitive to concentrations of VOCs and NO_x, compared to its sensitivity to VOC control in the VOC-limited region and its sensitivity to NO_x control in the NO_x-limited region. The ozone sensitivity to the VOC is studied after the NO_x concentrations are optimized to yield the maximum ozone concentration. The EBIR is the incremental reactivity computed for conditions in which ozone sensitivity to VOC is equal to that of NO_x. The scenario is characterized by higher VOC-to-NO_x ratios such that VOC and NO_x controls are equally effective in reducing ozone. Carter evaluated each of the scales and concluded that, if only one scale is to be used for regulatory purposes, the MIR scale is the most appropriate for California (Carter, 1994).

Although the MOIR is computed for conditions that maximize the ozone concentration, the MOIR and EBIR are more representative of the lower NO_x and higher VOC conditions. In the grid modeling study conducted by McNair *et al.,* (McNair *et al.*, 1992), a 3-D model was applied to a 3-day pollution episode in the Los Angeles Air Basin. The results showed that the MIRs derived from the box models did not perform well in predicting peak ozone sensitivities to individual VOCs, but performed reasonably well in predicting the effects of the VOCs on the integrated exposure to ozone over the air quality standard. The MOIR scale did not compare as well as the MIR scale to either the peak ozone concentration or ozone exposure concentrations greater than the air quality standard. In another study, Bergin *et al.* (Bergin *et al.,* 1995; 1998a) conducted a more direct comparison with the MIR and MOIR scales. The results showed that the metrics compared relatively better with the MIR scale than with the MOIR scale. The results suggest that the MIR scale is most appropriate in areas rich in NO_x.

The ARB proposed using the MIR scale for regulatory applications because the MIR scale reflects reactivities under environmental conditions that are most sensitive to the effects of VOC controls, such as in the South Coast Air Basin. The scale would be most accurate for VOC-limited conditions, in which VOC controls would be most effective. The MIR scale was also found to correlate well to scales based on integrated ozone yields, even in lower NO_x scenarios (McNair *et al.*, 1992; Bergin *et al.*, 1995; 1998a). Currently, the MIR scale is used to derive reactivity adjustment factors in the Low Emission Vehicle/ Clean Fuels regulations. Moreover, the MIR scale tends to predict low reactivities for slowly reacting compounds. The wider range of VOC incremental reactivities in the MIR scale allows better discrimination in a manufacturer's selection of a slower-reactive VOC substitution for a relatively higher-reactive VOC solvent.

d. Next-Generation Environmental Chamber

Industry has suggested that the "next-generation" environmental chamber will determine when a reduction of VOCs in architectural coatings is warranted (Kessler, 1999). They state that development of the SCM should be delayed until the results of the chamber experiments are known (Kessler, 1999).

In 1999, Carter *et al*., submitted a proposal and received funding to develop a "next-generation" environmental chamber to use for VOC reactivity evaluations (Carter *et al.*, 1999). The objectives of the experiments in the new chamber are to evaluate gas-phase and gas-to-particle atmospheric reaction mechanisms for determining secondary aerosol yields, and to measure VOC reaction products and radical and NO_X indicator species under more realistic environmental conditions (specifically, lower NO_X environments) (Congressional Record, 1998; Carter *et al.*, 1999). The chamber may also improve the reactivity assessments of larger (C_{10}-C_{12}) species that, using current methodologies, tend to stick to chamber walls before they can participate in the gas phase reactions.

ARB staff believes that the new chamber will likely provide improved data and better understanding of VOC reactivity that could ultimately result in an improved ozone control strategy. The ARB has always endeavored to use the best available science when developing regulations, and relevant data from chamber experiments will be evaluated for consideration in future regulatory actions. However, conclusive and complete experimental results will not be available for several years (Carter *et al.*, 1999). Given the timeframes for the additional reductions from architectural coatings, development of the Suggested Control Measure can not be delayed until improved reactivity data are available (Federal Register, 1997). As explained in Chapter IV (see the More Reactivity section), the evidence demonstrates that mass-based controls are effective in reducing ozone, so there is no reason to wait for additional reactivity data to be generated.

Another issue of concern is the reliability of the reactivity estimates of some larger and less volatile VOC species used in architectural coatings. For these compounds, atmospheric chamber experiments are difficult to perform using current methodologies. Because of their low volatility, these compounds are difficult to introduce into the chamber, and once in the chamber, they tend to stick to surfaces instead of participating in the atmospheric reactions of interest. This adds significant uncertainty to the results. The design of the “next-generation” chamber should address some of the problems associated with the compound after it is introduced into the chamber. The design improvements will include larger volume to minimize surface effects, better cleaning between runs to reduce cross contamination, and methods to reduce infiltration of contaminated ambient air. Better methods to study low volatility compounds are being investigated under a current ARB contract with Carter (Carter, 1999b). In summary, the next-generation chamber and new experimental techniques should address some problems associated with chamber testing of the low volatility compounds and improve reactivity estimates.

e. Conclusion

As described in the above sections, the ARB agrees with industry that reactivity-based limits hold promise as a VOC control strategy that may be effective for reducing the ozone formation potential from architectural coatings. However, for reasons also described above, additional data are necessary before assessing the feasibility of a reactivity-based control strategy for architectural coatings. Because additional reductions are needed in the near term, and that historical data indicate mass-based controls effectively reduce O_3, it is necessary to go forward with mass-based VOC limits at this time.

C. DESCRIPTION OF ALTERNATIVES CONSIDERED FEASIBLE

The rationale for selecting and modifying specific components of the proposed SCM to generate feasible alternatives for analysis is based on CEQA’s requirement to present “realistic” alternatives, that is, alternatives that can actually be implemented. The following four alternatives are considered to be feasible: a) No Project, b) Extended Compliance Deadlines,
c) Further Reduction of VOC Content Limits, and d) Product Line Averaging.

These four alternatives represent the ARB staff’s attempt to choose a reasonable range of defined alternatives for additional examination, as required by CEQA. In addition to the alternatives specifically discussed in this chapter, it should be noted that other alternatives were also considered by the ARB staff during the development of the SCM. These alternatives consist of the many variations in the language of the SCM that were considered during the development of the SCM, as different versions of the SCM were distributed to the public, and modifications to the SCM's language that were made in response to comments received from industry and the air districts. The current version of the proposed SCM incorporates many of these suggested changes.

Table V-2 identifies the major components of the SCM and each of the project alternatives. All other components of the SCM not identified in the following subsections or in Table V-2 would also be included in the proposed project alternatives.

1. Alternative A - No Project

This alternative assumes that the SCM will not be adopted. Districts would be subject to the National AIM rule, and some districts may adopt their own architectural coatings rules, which would probably not be consistent with one another. As a result, VOC emissions from architectural coatings may not be further reduced statewide, or may be reduced less than would be the case if the SCM were available as a model rule.

2. Alternative B - Extended Compliance Deadlines

Alternative B would extend all of the effective dates for the VOC content limits to January 1, 2004. The VOC content limits for affected coatings would be identical to those in the current version of the proposed SCM.

3. Alternative C - Further Reduction of VOC Content Limits

Alternative C would further reduce the VOC content limits for affected coatings categories (adoption of the "final" limits as described in Table 1 of Appendix C of the NOP/IS; (see Appendix B of this ~~Draft~~ Final Program EIR). The other proposed changes in the current proposed version of the SCM (see Appendix A) would be maintained.

4. Alternative D - Product Line Averaging

Alternative D, Product Line Averaging, would be a voluntary program allowing manufacturers to ~~make products that are above the proposed VOC limits in the SCM, if they compensate by reformulating other products below the proposed VOC limits. This alternative would be designed to achieve the same VOC emission reductions as the SCM~~ average the emissions of overcomplying coatings with the emissions of non-complying coatings. Although the proposed SCM does not currently include an averaging provision, ARB staff is currently working with interested parties to develop such a provision. The South Coast AQMD's Rule 1113 contains such a provision, and staff is looking at their approach for the SCM, with the inclusion of a sunset date. A sunset provision would be included to ensure that districts meet SIP commitments, and because the SCM does not contain VOC limits that are as stringent as the final limits in Rule 1113. ARB staff plans to propose an averaging provision for inclusion in the SCM when it is presented to the Board at the June 22, 2000, Board meeting.

A public workshop to discuss averaging ~~this alternative~~ was held on December 14, 1999. Subsequent to the workshop, an averaging committee was formed with representatives from industry, the air districts, and other interested parties. The first averaging committee meeting was held on January 20, 2000.

The averaging program under consideration by ARB staff would be designed to: (1) preserve the emission reductions that would be achieved by the proposed VOC limits in the SCM by the sunset date; (2) maintain the enforceability of district architectural coatings rules; and (3) provide flexibility and a more cost-effective means for manufacturers to comply with district architectural coatings rules. The averaging program would be implemented by including in the SCM a provision allowing manufacturers to choose the option of averaging, in lieu of complying with one or more of the VOC limits in the SCM. The provision under consideration would include an application process, ~~annual~~ reporting requirements~~, contingency measures for possible shortfalls in emission reductions~~, labeling provisions, and a violations provision to ensure enforceability. ~~However, ARB staff is also willing to consider an alternative program that would provide manufacturers with more flexibility, as long as the program is enforceable and would achieve the same VOC reductions.~~

~~The averaging program being considered by ARB staff would differ from the SCAQMD's averaging program in its Rule 1113 in several respects. First, the ARB's program would apply to all architectural coatings categories in the SCM (the SCAQMD's program only applies to 11 categories). Also, the ARB's program would allow trading of emission reduction credits, an option not included in the SCAQMD's program. Finally, the ARB's proposal would be more restrictive in including products already reformulated below the VOC limits in the proposed SCM. Specifically, products that were reformulated below the proposed VOC limits before January 1, 1997, would not be eligible for inclusion in the averaging program, and thus could not generate emission reduction "credits." This is because the reductions from these products have already been accounted for in the 1996 emission inventory for architectural coatings. These products would be allowed into the averaging program only if they were further reformulated after January 1, 1997, and in this case the baseline for calculating credits would be the VOC content of the products at the time of the post-1997 reformulation.~~

~~In contrast, the SCAQMD's averaging program in Rule 1113 would allow any product below the specified limits to be included in its averaging program, regardless of when the product was reformulated. The SCAQMD's averaging program should preserve the emission reductions from Rule 1113 when the final limits become effective, since the final limits are quite low compared to the current VOC levels of existing products. However, using the Rule 1113 averaging approach in the SCM is a problem, because the SCM VOC limits are largely based on SCAQMD's interim limits and are less stringent than the SCAQMD final limits. In this situation, using the Rule 1113 averaging approach may not preserve the emission reductions that would be achieved by the proposed SCM limits. Therefore, the ARB staff is not considering using the Rule 1113 averaging approach in the proposed SCM.~~

We believe that allowing companies the option to average would provide flexibility for industry, and would improve the cost-effectiveness of the rule. During the 12/14/99 and 1/20/00 meetings to discuss the averaging proposal, however, it was clear to ARB staff that ~~significant~~

~~difficulties exist in designing an averaging program that would meet the goals described above, would be practical to implement on a statewide basis, and would be acceptable to industry, the districts, and the U.S. EPA. It is not certain that these difficulties can be resolved in a timely manner, and~~ the details of the averaging provision would require additional time to be completed. ~~t~~Therefore the current project proposed by ARB staff is an SCM without an averaging provision. ~~If these difficulties can be~~ ARB staff expects to resolve~~d~~ the remaining details before the scheduled ~~May 25~~ June 22, 2000, Board meeting to consider the SCM, ~~the ARB staff will~~ in order to propose the inclusion of an averaging provision in the final version of the SCM.

Finally, it should be noted that the ARB's technical analysis contained in this ~~Draft~~ Final Program EIR applies whether or not an averaging provision is included in the SCM. In other words, the ARB's analysis demonstrates that each of the VOC limits contained in the SCM is independently feasible as a stand-alone, separate limit. Although the final text of the SCM ~~may~~ will include an averaging provision, each of the VOC limits in the SCM—and the SCM as a whole—is feasible with or without an averaging provision, and the technical analysis does not in any way depend on the existence of averaging in the SCM. Similarly, the environmental analysis in the ARB's ~~Draft~~ Final Program EIR is equally applicable to an SCM that contains an averaging provision, as well as an SCM that does not contain an averaging provision. This is because for each of the possible environmental impacts analyzed in the ~~Draft~~ Final Program EIR, the analysis assumes as a worst-case scenario that averaging will not occur.

To summarize, the ARB staff believes that averaging would make the rule more cost-effective, but the existence or absence of averaging does not affect either the ARB's analysis of the technical feasibility of VOC limits in the SCM, or the ARB's environmental analysis for the SCM.

D. COMPARISON OF THE ALTERNATIVES

The Initial Study (see Appendix B) identified those environmental topics where the SCM could potentially cause adverse environmental impacts. Further evaluation of these topics in Chapter IV of this ~~Draft~~ Final Program EIR reveals that there would be no significant impacts from implementation of the SCM.

The following subsections briefly describe potential environmental impacts that may be generated by each project alternative. Each environmental topic summary contains a brief description of the environmental impacts for each project alternative compared to impacts resulting from implementing the proposed SCM. Potential impacts for the environmental topics are quantified where sufficient data are available. A comparison of the impacts for each of the environmental topics is summarized in Table V-4 and the alternatives are ranked in Table V-5.

1. Air Quality

Alternative A, the No Project Alternative, assumes that the SCM will not be adopted. The existing architectural coatings rules throughout California would remain in effect, and the National AIM Rule would remain in effect. Districts would be free to inconsistently adopt their own architectural coatings rules without any guidance from the SCM. As a result, up to approximately ~~11~~ 10 tons per day of VOC emission reductions from architectural coatings would not be achieved throughout California (excluding the SCAQMD). This scenario would potentially jeopardize the ability of districts to meet and maintain federal and State ozone standards.

Alternative B, Extended Compliance Deadlines, would extend the VOC content limits to January 1, 2004. The VOC content limits for affected coatings would be identical to those proposed in the current version of the SCM. As shown in Table V-3, this alternative would result in estimated daily VOC emission reductions by the year 2004 of ~~11~~ 10 tons per day. This alternative would ultimately achieve the same VOC emission reductions as the SCM. However, the VOC emission reductions for all categories except IM coatings would be achieved one year later.

Alternative C, Further Reduction of VOC Content Limits, would require affected coatings categories to meet the final VOC content limits as described in the June 10, 1999, version of the SCM. As shown in Table V-3, this alternative would achieve VOC emission reductions of approximately 24 tons per day by the year 2008, or an additional ~~13~~ 14 tons per day VOC emission reductions than the proposed project.

Alternative D, Product Line Averaging, would add a voluntary averaging program to the SCM. As explained previously, the averaging program would be designed to achieve the same VOC emission reductions as the proposed SCM by the sunset date. Accordingly, Table V-3 shows that this alternative would achieve VOC emission reductions of ~~11~~ up to 10 tons per day by the year 2004~~, the same as the proposed SCM~~. Depending on the amount of averaging that takes place, some of these reductions may be delayed until the sunset date.

2. Water

a. Water Demand

Alternative A assumes that the SCM will not be adopted. The water demand impacts associated with the use of current coatings would remain constant under the No Project Alternative. As a result of not implementing the proposed VOC content limits, which are anticipated to be met using more waterborne technology, this alternative would have less water demand impacts compared to the proposed project. Thus, Alternative A would not create any new or additional water demand impacts.

Alternative B would extend the VOC content limits to January 1, 2004. Since the affected coatings categories will be reformulated with the same waterborne technology to meet the VOC content limits, this alternative would result in similar insignificant water demand impacts as the proposed project, but the impacts would occur one year later.

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Alternative C would implement the final VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. However, the worst-case scenario analyzed in the ~~Draft~~ Final Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that water demand impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that water demand impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant water demand impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging provision to the SCM. Since the affected coatings will be reformulated with the same waterborne technology to meet the VOC content limits, this alternative would result in similar insignificant water demand impacts as the proposed project.

b. Water Quality

Alternative A assumes that the SCM will not be adopted. No change in the current quantities of coatings entering the sewer systems, storm drainage systems, or groundwater within California should occur under the No Project Alternative because current practices are expected to be maintained. Thus, Alternative A would not create any new or additional water quality impacts.

Alternative B would extend the SCM VOC content limits to January 1, 2004. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the later Alternative B VOC content limits. Therefore, Alternative B would result in similar insignificant water quality impacts (*e.g.*, wastewater, storm water, and groundwater) as the proposed project, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. However, the worst-case scenario analyzed in the ~~Draft~~ Final Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that water quality impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that water quality impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant water quality impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the requirements under Alternative D. Therefore, Alternative D would result in similar insignificant water quality impacts (e.g., wastewater, storm water, and ground water) as the proposed project.

3. Public Services

a. Public Facility Maintenance

The No Project Alternative would not require any changes to coatings application practices done for maintenance purposes at public facilities. Thus, Alternative A would not create any new or additional public facility maintenance impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the later Alternative B VOC content limits. Therefore, Alternative B would result in similar insignificant public facility maintenance impacts as the proposed project, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. As a result, end-users would be required to use coatings with a lower VOC content. However, based on the SCAQMD's technology assessment for Rule 1113 (SCAQMD, 1999), these lower VOC coatings perform as well as higher VOC coatings. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant public facility maintenance as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the requirements of Alternative D. Therefore, Alternative D would result in similar insignificant public facility maintenance impacts as the proposed project.

b. Fire Protection

The No Project Alternative will not change the current impacts on fire departments. Districts would be subject to the National AIM Rule unless they decided to adopt lower VOC content limits. This would mean the continued use of coatings that contain NFPA 3 flammable solvents such as toluene, xylenes, MEK, mineral spirits, and others. Therefore, Alternative A would not create any new or additional fire department impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less flammable solvents. The exception to this would be the use of acetone in lacquer, floor coating, and waterproofing sealer reformulations. However, fire departments treat all NFPA 3 flammable liquids the same. Because the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits, Alternative B would result in similar insignificant impacts to fire departments as the SCM, but the impacts would occur one year later.

TABLE V-2
THE SCM AND PROJECT ALTERNATIVES[1]

Coating Category	**Proposed SCM or Alternative D - Product Line Averaging [3]**		**Alternative A - No Project [2]**	**Alternative B - Extended Compliance Deadlines**		**Alternative C - Further Reduction of VOC Content Limits**	
	Proposed Limit (G/L)	Compliance Dates	Current Limit (G/L)	Proposed Limit (G/L)	Compliance Dates	Proposed Limit (G/L)	Compliance Dates
Flat Coatings	100	01/01/03	250	100	01/01/04	50	07/01/08
Nonflat Coatings	150	01/01/03	250	150	01/01/04	50	07/01/06
Nonflat – High Gloss Coatings	250	1/1/03	250	250	1/1/04	50	07/01/06
Lacquers	550	01/01/03	680	550	01/01/04	275	01/01/05
Floor Coatings	~~100~~ 250	01/01/03	~~400~~ 250	~~100~~ 250	01/01/04	50	07/01/06
Industrial Maintenance Coatings	250	01/01/04	420	250	01/01/04	100	07/01/06
Primers, Sealers, and Undercoaters	200	01/01/03	350	200	01/01/04	100	07/01/06
Quick-Dry Enamels	250	01/01/03	400	250	01/01/04	50	07/01/06
Quick-Dry Primers, Sealers, and Undercoaters	200	01/01/03	450	200	01/01/04	100	07/01/06
Rust Preventative Coatings	400	01/01/03	400	400	01/01/04	100	07/01/06
Stains	250	01/01/03	350	250	01/01/04	-----	-----
Waterproofing Sealers – Wood	250	01/01/03	400	250	01/01/04	-----	-----
Waterproofing Sealers – Concrete	400	1/1/03	400	400	1/1/04	-----	-----

1) Grams of VOC per liter of coating, less water and less exempt compounds

2) Under the No Project alternative, the "current limit" would be the limits (if any) that are currently applicable in each district (see Appendix B).
3) Alternative D – Although Product Line Averaging would allow some products to exceed the proposed VOC limits, the overall emission reductions achieved by the sunset date would, in the aggregate, equal the reductions achieved if all products met the proposed limits.

TABLE V-3
COMPARISON OF VOC EMISSION REDUCTIONS FROM THE SCM AND THE PROJECT ALTERNATIVES (tons per day)*

Year Reductions Achieved	**Proposed SCM or Alternative D**** (Product Line Averaging)	**Alternative A** (No Project)	**Alternative B** (Extended Compliance Deadlines)	**Alternative C** (Further Reduction of VOC Content Limits)
2003	~~8.32~~ 7.3	0	0	~~11.30~~ 10.3
2004	~~2.98~~ 3.0	0	~~11.30~~ 10.3	↓
2008+	↓	0	↓	~~13.29~~ 13.3
TOTAL	**~~11.30~~ 10.3**	**0**	**~~11.30~~ 10.3**	**~~24.59~~ 23.6**

* Excludes SCAQMD
** Depending on the amount of averaging that takes place, some of these reductions may be delayed until the sunset date.
↓ = Same amount of VOC emission reduction obtained as previous years.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. Manufacturers would be required to reformulate all solvent-borne coatings containing more flammable solvents with waterborne technology containing less flammable solvents (*e.g.*, diisocyanates, Texanol, propylene glycol, and ethylene glycol). Therefore, Alternative C would result in fewer fire department impacts than would be expected from implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less flammable solvents. The exception to this would be the use of acetone, for example, in lacquer~~, floor coating, and waterproofing sealer~~ reformulations. However, fire departments treat all NFPA 3 flammable liquids the same. Because the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D provisions, Alternative D would result in similar insignificant impacts to fire departments as the SCM.

4. Transportation/Circulation

The No Project Alternative would not require any changes to existing coatings manufacturing processes or coatings application practices. The volume of traffic or traffic circulation patterns associated with the manufacturing, distribution, and use of architectural coatings would not change under Alternative A. Thus, Alternative A would not create any new or additional transportation/circulation impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. However, the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits. Thus, any additional trips associated with the potential disposal of reformulated low-VOC waterborne coatings due to freeze-thaw, shelf-life, or pot-life problems would be the same as for the SCM. Therefore, Alternative B would result in similar insignificant transportation/circulation impacts as the proposed project, but the impacts would occur one year later.

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Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. Thus, any additional trips associated with the disposal of reformulated low-VOC waterborne coatings due to freeze-thaw, shelf-life, or pot-life problems could potentially be greater than the SCM. However, the worst-case scenario analyzed in the ~~Draft~~ Final Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that transportation/circulation impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that transportation/circulation impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant transportation/circulation impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D requirements. Thus, any additional trips associated with the potential disposal of reformulated low-VOC waterborne coatings due to freeze-thaw, shelf-life, or pot-life problems would be the same as for the SCM. Therefore, Alternative D would result in similar insignificant transportation/circulation impacts as the proposed project.

5. Solid Waste/Hazardous Waste

The No Project Alternative would not require any changes to existing coatings manufacturing processes or coatings application practices. The volume of solid waste/hazardous waste generated from the manufacturing, distribution, and use of architectural coatings would not change under Alternative A. Thus, Alternative A would not create any new or additional solid waste/hazardous waste impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. However, the volume of solid waste/hazardous waste generated from the manufacturing, distribution, and use of architectural coatings would be identical to that generated by the SCM. Therefore, Alternative B would result in similar insignificant solid waste/hazardous waste impacts as the SCM, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. Thus, there could be potential additional coatings landfilled as a result of freeze-thaw, shelf life, or pot-life problems associated with the use of reformulated low-VOC waterborne coatings. However, the worst-case scenario analyzed in the ~~Draft~~ Final Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that solid waste/hazardous waste impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that solid waste/hazardous waste impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant solid waste/hazardous waste impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the volume of solid waste/hazardous waste generated from the manufacturing, distribution, and use of architectural coatings would be the same as that generated by the SCM. Therefore, Alternative D would result in similar insignificant solid waste/hazardous waste impacts as the SCM.

6. Hazards

a. Risk of Upset

The No Project Alternative will not change the current risk of upset impacts associated with the manufacture, distribution, and use of architectural coatings. Districts would be subject to the National AIM Rule unless they decided to adopt lower VOC content limits. This would mean the continued use of coatings that contain flammable solvents such as toluene, xylene, MEK, mineral spirits, and others. Thus, Alternative A would not create any additional risk of upset impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less flammable solvents. The exception to this would be the use of acetone in lacquer, floor coating, and waterproofing sealer reformulations. However, as mentioned above, fire departments treat all NFPA 3 flammable liquids the same. For some coatings categories (IM and floor coatings), more toxic but less flammable solvents, such as TDI, MDI, and HDI, may be used to meet the VOC content limits of the SCM. However, the use of these solvents, when balanced against the use of more flammable but less toxic conventional solvents, would result in similar insignificant risk of upset impacts as the proposed project. The same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits. Therefore, Alternative B would result in similar insignificant risk of upset impacts as the proposed project, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. In the context of flat, nonflat, and rust preventative coatings, resin manufacturers and coatings formulators would be replacing current coalescing solvents such as EGBE with less toxic and less flammable solvents such as Texanol and propylene glycol in their waterborne formulations. Conversely, in the context of IM coatings, coatings formulators would be incrementally increasing the use of two-component polyurethane waterborne systems containing toxic solvents such as TDI, HDI, and MDI.

Therefore, when balancing the loss of solvents that are more toxic and more flammable against the incremental increase in the use of certain coatings containing more toxic solvents, Alternative C would result in similar insignificant risk of upset impacts as the proposed project.

Alternative D would add a voluntary averaging program to the SCM. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less flammable solvents. The exception to this would be the use of acetone in, for example, lacquer~~, floor coating, and waterproofing sealer~~ reformulations. However, as mentioned above, fire departments treat all NFPA 3 flammable liquids the same. For some coatings categories (IM and floor coatings), more toxic but less flammable solvents, such as TDI, MDI, and HDI, may be used to meet the VOC content limits of the SCM. However, the use of these solvents, when balanced against the use of more flammable but less toxic conventional solvents, would result in similar insignificant risk of upset impacts as the proposed project. The same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D requirements. Therefore, Alternative D would result in similar insignificant risk of upset impacts as the proposed project.

b. Human Health

Under the No Project Alternative, districts would be subject to the National AIM Rule unless they decided to adopt lower VOC content limits. This would mean the continued use of coatings that contain toxic solvents such as toluene, xylene, MEK, mineral spirits, and others. Thus, Alternative A would not create any additional human health impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. It is anticipated that the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits. However, in the context of compliant two-component, waterborne IM systems containing TDI, HDI, and MDI, since formulators have additional time to develop coatings, they may be able to formulate systems containing less toxic compounds or develop better application techniques to further reduce exposure to these compounds. Therefore, Alternative B could result in slightly fewer human health impacts as compared to the insignificant health impacts of the SCM.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. In the context of flats, nonflats, and rust preventative coatings, resin manufacturers and coatings formulators would be replacing current coalescing solvents such as EGBE with less toxic solvents such as Texanol and propylene glycol in their waterborne formulations. Conversely, in the context of IM coatings, coatings formulators would be incrementally increasing the use of two-component polyurethane waterborne systems containing toxic solvents such as TDI, HDI, and MDI. Therefore, when balancing the loss of solvents that are less toxic against the incremental increase in the use of coatings containing more toxic replacement solvents, Alternative C would result in similar insignificant human health impacts as the proposed project.

Alternative D would add a voluntary averaging program to the SCM. It is anticipated that the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D requirements. Therefore, Alternative D would result in similar insignificant human health impacts as the proposed project.

E. CONCLUSION

Pursuant to CEQA Guidelines §15126.6(d), a matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. Table V-4 lists the alternatives considered by the ARB and how they compare to the SCM. Table V-5 presents a matrix that lists the significant adverse impacts as well as the cumulative impacts associated with the proposed project and the project alternatives for all environmental topics analyzed. The table also ranks each impact section as to whether the proposed project or a project alternative would result in greater or lesser impacts relative to one another.

Pursuant to CEQA Guidelines §15126.6(e)(2), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Since the No Project alternative (Alternative A) would not ultimately achieve the long-term air quality benefits (*e.g.,* VOC reductions) of the SCM, it is not the environmentally superior alternative.

Following is a brief explanation of why the ARB staff is proposing to recommend the approach specified in the SCM for adoption by the Board, instead of Alternatives A, B, C, or D. Alternative A (No Project) is not favored by staff because it would likely result in fewer emission reductions than the SCM, and most of California needs additional emission reductions to achieve and maintain air quality standards. In addition, without the SCM, districts who decided to adopt architectural coatings rules would probably adopt rules that would be inconsistent with each other. Such inconsistency among the districts is not good because it is confusing for coatings manufacturers and distributors, creates enforcement difficulties, and results in increased costs for inventory management.

Alternative B is not favored by ARB staff because staff believes that the VOC limits in the SCM are feasible to achieve by January 1, 2003 (January 1, 2004, for IM coatings), and that it is not necessary to allow additional time to comply. Both the federal and California Clean Air Acts mandate that air quality standards be attained as expeditiously as practicable, and California's serious air quality problems require that any delay in achieving emission reductions must be technically or economically justified. Based on all of the information received to date, staff does not believe such a delay is warranted.

Alternative C (adoption of the final limits proposed in the June 10, 1999, version of the SCM) is not favored by ARB staff due to the need to focus limited staff resources on the technical, environmental, and economic issues associated with adoption of the interim limits.

Alternative D (product line averaging), as discussed previously, is being developed ~~not favored~~ by ARB staff at this time. ~~because of difficulties in resolving the complexities associated with a statewide averaging program. If the ARB staff, in consultation with the districts and the affected industry, is able to~~

~~resolve these difficulties in a timely manner,~~ ARB staff will propose the inclusion of a product line averaging program in the final version of the SCM.

The ARB staff believes that the SCM is necessary to achieve the further VOC reductions needed to attain State and national ambient air quality standards, and encourage statewide uniformity of district architectural coatings rules. Otherwise, districts will need to identify other source categories from which to reduce VOC emissions. This may be difficult to do. Assuming that the Board approves the SCM, the ARB staff intends to begin work on developing lower VOC content limits for architectural coatings. The ARB staff intends to use the final VOC content limits in SCAQMD's Rule 1113 as a model for proposing lower VOC content limits in the SCM. ARB staff also intends to investigate the feasibility of proposing a reactivity-based control strategy for architectural coatings, and will update the Board on the status of this investigation.

TABLE V-4
COMPARISON OF POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE SCM TO THE ALTERNATIVES

Environmental Topic	**Alternative A** (No Project)	**Alternative B** (Extended Compliance Deadlines)	**Alternative C** (Further Reduction of VOC Content Limits)	**Alternative D** (Product Line Averaging)	**Mitigation Measures**
Air Quality	Significant, greater than the SCM	Not Significant, equivalent to the SCM	Not Significant, less than the SCM	Not significant, equivalent to the SCM	None Required
Water Demand	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Water Quality	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Public Resources Public Facility Maintenance	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Fire Protection	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	Not Significant, less than the SCM	Not significant, equivalent to the SCM	None Required
Transportation/ Circulation	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Solid/Hazardous Waste	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Hazards Risk of Upset	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	Not significant, equivalent to the SCM	None Required
Human Health	Not Significant, equivalent to the SCM	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	None Required

TABLE V-5
RANKING OF ALTERNATIVES

Project/ Alter-Natives	**Air Quality Impacts**		**Water Demand Impacts**		**Water Quality Impacts**		**Public Facility Maintenance Impacts**		**Fire Protection Impacts**		**Transportation/ Circulation Impacts**		**Solid/Hazardous Waste Impacts**		**Risk of Upset Impacts**		**Human Health**	
	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.
SCM	✓ ***(1)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(1)***	✓	✓ ***(1)***	✓
Alt. A	✓ ***(3)***	✓	✓ ***(1)***	✓	✓ ***(3)***	✓	✓ ***(1)***	✓	✓ ***(3)***	✓	✓ ***(1)***	✓	✓ ***(1)***	✓	✓ ***(1)***	✓	✓ ***(1)***	✓
Alt. B	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(1)***	✓	✓ ***(1)***	✓
Alt. C	✓ ***(1)***	✓	✓ ***(3)***	✓	✓ ***(2)***	✓	✓ ***(3)***	✓	✓ ***(1)***	✓	✓ ***(3)***	✓	✓ ***(3)***	✓	✓ ***(1)***	✓	✓ ***(1)***	✓
Alt. D	✓ ***(1)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(2)***	✓	✓ ***(1)***	✓	✓ ***(1)***	✓

Notes: The ranking scale is such that 1 represents the least impacts and subsequent higher numbers represent increasingly worse impacts.
The same two numbers in brackets for a specific Impact Section means that these proposals would have the same impacts if implemented.
An X denotes either a project-specific significant adverse impact or cumulative significant adverse impact.
A ✓ denotes no significant adverse impact or no cumulative significant adverse impact.
Proj. = Project-Specific Impacts.
Cum. = Cumulative Impacts.

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APPENDIX A

PROPOSED SUGGESTED CONTROL MEASURE
(5/22/00 version compared to 2/11/00 version)

~~Note: Appendix A contains two versions of the proposed Suggested Control Measure (SCM). The text of each version is identical; only the formatting is different.~~

~~The first version is a "clean copy" of the currently proposed SCM, with no underlines or strikeouts. The second version displays the differences between the text of the currently proposed SCM, and the text of the proposed SCM (dated 6/10/99) that was contained in Appendix C to the June 11, 1999, "Notice of Preparation and Initial Study". Text that has been added to the 6/10/99 SCM is shown in underline, and text that has been deleted is shown in strikeout.~~

~~For those individuals who may be interested, a third version of the SCM is available on the ARB's Internet site at http://www.arb.ca.gov/arch/recent.htm. The text of the third version is the same as the two versions described above, but the third version has been formatted to display the differences between the currently proposed SCM, and the text of the proposed SCM that is dated 12/1/99, and was made available for discussion purposes in connection with the December 14, 1999, public workshop. Text that has been added to the 12/1/99 SCM is shown in underline, and text that has been deleted is shown in strikeout.~~

~~PROPOSED SUGGESTED CONTROL MEASURE (2/11/00)~~

Note: This version of the SCM has been removed from the Final Program EIR for clarity.

~~PROPOSED SUGGESTED CONTROL MEASURE (2/11/00) COMPARED TO 6/10/99 VERSION IN NOP/IS~~

Note: This version of the SCM has been removed from the Final Program EIR for clarity.

Draft 5/22/00 compared to 2/11/00

xxx 2000

California Air Resources Board (ARB)
Suggested Control Measure for Architectural Coatings

RULE _____ ARCHITECTURAL COATINGS

1. APPLICABILITY

1.1 Except as provided in subsection 1.2, this rule is applicable to any person who supplies, sells, offers for sale, or manufactures any architectural coating for use within the District, as well as any person who applies or solicits the application of any architectural coating within the District.

1.2 This rule does not apply to:

1.2.1 Any architectural coating that is sold or manufactured for use outside of the District or for shipment to other manufacturers for reformulation or repackaging.
1.2.2 Any aerosol coating product.
1.2.3 Any architectural coating that is sold in a container with a volume of one liter (1.057 quart) or less.

2. DEFINITIONS

2.0 Adhesive: Any chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means.

2.1 Aerosol Coating Product: A pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground traffic/marking applications.

2.2 Antenna Coating: A coating labeled ~~as~~ and formulated exclusively for application to equipment and associated structural appurtenances that are used to receive or transmit electromagnetic signals.

2.3 Antifouling Coating: A coating labeled ~~as~~ and formulated for application to submerged stationary structures and their appurtenances to prevent or reduce the attachment of marine or freshwater biological organisms. To qualify as an antifouling coating, the coating must be registered with both the U.S. EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Section 136, *et seq.*) and with the California Department of Pesticide Regulation.

2.4 Appurtenance: Any accessory to a stationary structure coated at the site of installation, whether installed or detached, including but not limited to: bathroom and kitchen fixtures; cabinets; concrete forms; doors; elevators; fences; hand railings; heating equipment, air conditioning equipment, and other fixed mechanical equipment or stationary tools; lampposts; partitions; pipes and piping systems; rain gutters and downspouts; stairways, fixed ladders, catwalks, and fire escapes; and window screens.

2.5 Architectural Coating: A coating to be applied to stationary structures and their appurtenances at the site of installation, to portable buildings at the site of installation, to pavements, or to curbs. Coatings applied in shop applications or to non-stationary structures such as airplanes, ships, boats, railcars, and automobiles, and adhesives are not considered architectural coatings for the purposes of this rule.

2.6 Bitumens: Black or brown materials including, but not limited to, asphalt, tar, pitch, and asphaltite that are soluble in carbon disulfide, consist mainly of hydrocarbons, and are obtained from natural deposits or as residues from the distillation of crude petroleum or coal.

2.7 Bituminous Roof Coating: A coating which incorporates bitumens that is labeled ~~as~~ and formulated exclusively for roofing~~ that incorporates bitumens~~.

2.8 Bituminous Roof Primer: A primer which incorporates bitumens that is labeled and formulated exclusively for roofing.

2.~~8~~ 9 Bond Breaker: A coating labeled ~~as~~ and formulated for application between layers of concrete to prevent a freshly poured top layer of concrete from bonding to the layer over which it is poured.

2.~~9~~ 10 Clear Brushing Lacquers: Clear wood finishes, excluding clear lacquer sanding sealers, formulated with nitrocellulose or synthetic resins to dry by solvent evaporation without chemical reaction and to provide a solid, protective film, which are intended exclusively for application by brush, and which are labeled as specified in subsection 4.1.5.

2.11~~0~~ Clear Wood Coatings: Clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a transparent or translucent solid film.

2.12~~1~~ Coating: A material applied onto or impregnated into a substrate for protective, decorative, or functional purposes. Such materials include, but are not limited to, paints, varnishes, sealers, and stains.

2.13~~2~~ Colorant: A concentrated pigment dispersion in water, solvent, and/or binder that is added to an architectural coating after packaging in sale units to produce the desired color.

2.14~~3~~ Concrete Curing Compound: A coating labeled ~~as~~ and formulated for application to freshly poured concrete to retard the evaporation of water.

2.15~~4~~ Dry Fog Coating: A coating labeled ~~as~~ and formulated only for spray application such that overspray droplets dry before subsequent contact with incidental surfaces in the vicinity of the surface coating activity.

2.16~~5~~ Exempt Compound: A compound identified as exempt under the definition of Volatile Organic Compound (VOC), subsection 2.60 ~~57~~. Exempt compounds content of a coating shall be determined by U.S. EPA Method 24 or South Coast Air Quality Management District (SCAQMD) Method 303-91 (Revised February 1993), incorporated by reference in subsection 6.5.10.

2.17~~6~~ Faux Finishing Coating: A coating labeled and formulated as a stain or glaze to create artistic effects including, but not limited to, dirt, old age, smoke damage, and simulated marble and wood grain.

2.18~~7~~ Fire-Resistive Coating: An opaque coating labeled ~~as~~ and formulated to protect the structural integrity by increasing the fire endurance of interior or exterior steel and other structural materials, that has been fire tested and rated by a testing agency approved by building code officials for use in bringing assemblies of structural materials into compliance with federal, state, and local building code requirements. The fire-resistive coating and the testing agency must be approved by building code officials. The fire-resistant coating shall be tested in accordance with ASTM Designation E 119-98, incorporated by reference in subsection 6.5.2.

2.19~~8~~ Fire-Retardant Coating: A coating labeled ~~as~~ and formulated to retard ignition and flame spread, that has been fire tested and rated by a testing agency approved by building code officials for use in bringing building and construction materials into compliance with federal, state and local building code requirements. The fire-retardant coating and the testing agency must be approved by building code officials. The fire-retardant coating shall be tested in accordance with ASTM Designation E 84-99, incorporated by reference in subsection 6.5.1.

2.20~~19~~ Flat Coating: A coating that is not defined under any other definition in this rule and that registers gloss less than 15 on an 85-degree meter or less than 5 on a 60-degree meter according to ASTM Designation D 523-89 (1999), incorporated by reference in subsection 6.5.3.

2.21~~0~~ Floor Coating: An opaque coating that is labeled ~~as~~ and formulated for application to flooring, including, but not limited to, decks, porches, steps, and other horizontal surfaces which may be subject to foot traffic. ~~, for the purposes of abrasion resistance.~~

2.22~~1~~ Flow Coating: A coating labeled and formulated exclusively for use ~~that is used~~ by electric power companies or their subcontractors ~~exclusively~~ to maintain the protective coating systems present on utility transformer units.

2.23~~2~~ Form-Release Compound: A coating labeled ~~as~~ and formulated for application 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.

2.24~~3~~ Graphic Arts Coating or Sign Paint: A coating labeled ~~as~~ and formulated for hand-application 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.

2.25~~-4~~ High-Temperature Coating: A high performance coating labeled ~~as~~ and formulated for application to substrates exposed continuously or intermittently to temperatures above 204°C (400°F).

2.26~~5~~ Industrial Maintenance Coating: A high performance architectural coating, ~~excluding floor coatings but~~ including primers, sealers, undercoaters, intermediate coats, and topcoats, formulated for application to substrates exposed to one or more of the following extreme environmental conditions listed in subsections 2.26~~5~~.1 through 2.26~~5~~.5, and labeled as specified in subsection 4.1.4:

2.26~~5~~.1 Immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;
2.26~~5~~.2 Acute or chronic exposure to corrosive, caustic or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;
2.26~~5~~.3 Repeated exposure to temperatures above 121°C (250°F);
2.26~~5~~.4 Repeated (frequent) heavy abrasion, including mechanical wear and repeated (frequent) scrubbing with industrial solvents, cleansers, or scouring agents; or
2.26~~5~~.5 Exterior exposure of metal structures and structural components.

2.27~~6~~ Lacquer: A clear or opaque wood coating, including clear lacquer sanding sealers, formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and to provide a solid, protective film.~~ Lacquer stains are considered stains, not lacquers.~~

2.28~~7~~ Low Solids Coating: A coating containing 0.12 kilogram or less of solids per liter (1 pound or less of solids per gallon) of coating material.

2.29~~8~~ Magnesite Cement Coating: A coating labeled ~~as~~ and formulated for application to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

2.30~~29~~ Mastic Texture Coating: A coating labeled ~~as~~ and formulated to cover holes and minor cracks and to conceal surface irregularities, and is applied in a single coat of at least 10 mils (0.010 inch) dry film thickness.

2.31~~0~~ Metallic Pigmented Coating: A coating containing at least 48 grams of elemental metallic pigment per liter of coating as applied (0.4 pounds per gallon), when tested in accordance with SCAQMD Method 318-95, incorporated by reference in subsection 6.5.4.

2.32~~1~~ Multi-Color Coating: A coating that is packaged in a single container and that exhibits more than one color when applied in a single coat.

2.33~~2~~ Nonflat Coating: A coating that is not defined under any other definition in this rule and that registers a gloss of 15 or greater on an 85-degree meter and 5 or greater on a 60-degree meter according to ASTM Designation D 523-89 (1999), incorporated by reference in subsection 6.5.3.

2.34 Nonflat - High Gloss Coating: A nonflat coating that registers a gloss of 70 or above on a 60 degree meter according to ASTM Designation D 523-89 (1999), incorporated by reference in subsection 6.5.3.

2.35 Nonindustrial Use: Nonindustrial use means any use of architectural coatings except in the construction or maintenance of any of the following: facilities used in the manufacturing of goods and commodities; transportation infrastructure, including highways, bridges, airports and railroads; facilities used in mining activities, including petroleum extraction; and utilities infrastructure, including power generation and distribution, and water treatment and distribution systems.

2.36~~3~~ Post-Consumer Coating: A finished coating that would have been disposed of in a landfill, ~~as a solid waste,~~ having completed its usefulness to a consumer, and does not include manufacturing wastes.

2.37~~4~~ Pre-Treatment Wash Primer: A primer that contains a minimum of 0.5 percent acid, by weight, when tested in accordance with ASTM Designation D 1613-96, incorporated by reference in subsection 6.5.5, that is labeled ~~as~~ and formulated for application directly to bare metal surfaces to provide corrosion resistance and to promote adhesion of subsequent topcoats.

2.38~~5~~ Primer: A coating labeled ~~as~~ and formulated for application to a substrate to provide a firm bond between the substrate and subsequent coats.

2.39~~6~~ Quick-Dry Enamel: A nonflat coating that is labeled as specified in subsection 4.1.8 and that is ~~and~~ formulated to have the following characteristics:

2.39~~6~~.1 Is capable of being applied directly from the container under normal conditions with ambient temperatures between 16 and 27°C (60 and 80°F);

2.39~~6~~.2 When tested in accordance with ASTM Designation D 1640-95, incorporated by reference in subsection 6.5.6, sets to touch in 2 hours or less, is tack free in 4 hours or less, and dries hard in 8 hours or less by the mechanical test method; and

2.39~~6~~.3 Has a dried film gloss of 70 or above on a 60 degree meter.

2.40~~37~~ Quick-Dry Primer, Sealer, and Undercoater: A primer, sealer, or undercoater that is dry to the touch in 30 minutes and can be recoated in 2 hours when tested in accordance with ASTM Designation D 1640- 95, incorporated by reference in subsection 6.5.6.

2.41 ~~38~~ Recycled Coating: An architectural coating formulated such that not less than 50 percent of the total weight consists of secondary and post-consumer coating, with not less than 10 percent of the total weight consisting of post-consumer coating.

2.42~~39~~ Residence: Areas where people reside or lodge, including, but not limited to, single and multiple family dwellings, condominiums, mobile homes, apartment complexes, motels, and hotels.

2.43~~0~~ Roof Coating: A non-bituminous coating labeled ~~as~~ and formulated exclusively 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.

2.44~~1~~ Rust Preventative Coating: A coating formulated exclusively for nonindustrial use ~~in or on a residence~~ to prevent the corrosion of metal surfaces and labeled as specified in subsection 4.1.6.

2.45~~2~~ Sanding Sealer: A clear wood coating ~~sealer~~ labeled ~~as~~ and formulated for application to bare wood to seal the wood and to provide a coat that can be sanded to create a smooth surface for subsequent applications of coatings. A sanding sealer that also meets the definition of a lacquer is not included in this category, but is included in the lacquer category.

2.46~~3~~ Sealer: A coating labeled ~~as~~ and formulated for application to a substrate for one or more of the following purposes: to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.

2.47~~4~~ Secondary Coating (Rework): A fragment of a finished coating or a finished coating from a manufacturing process that has converted resources into a commodity of real economic value, but does not include excess virgin resources of the manufacturing process.

2.48~~5~~ Shellac: A clear or opaque coating formulated solely with the resinous secretions of the lac beetle (*Laciffer lacca*), thinned with alcohol, and formulated to dry by evaporation without a chemical reaction.

2.49~~6~~ Shop Application: Application of a coating to a product or a component of a product in or on the premises of a factory or a shop as part of a manufacturing, production, or repairing process (e.g., original equipment manufacturing coatings).

2.50~~47~~ Solicit: To require for use or to specify, by written or oral contract.

2.51~~48~~ Specialty Primer, Sealer, and Undercoater: A coating labeled as specified in subsection 4.1.7 and that is formulated for application to a substrate to seal fire, smoke or water damage; to condition excessively chalky surfaces, or to block stains. An excessively chalky surface is one that is defined as having a chalk rating of four or less as determined by ASTM Designation D 4214-98, incorporated by reference in subsection 6.5.7.

2.52~~49~~ Stain: A clear, semitransparent, or opaque ~~wood~~ coating labeled ~~as~~ and formulated to change the color of a surface but not conceal the grain pattern or texture. ~~, including lacquer stains.~~

2.53~~0~~ Swimming Pool Coating: A coating labeled ~~as~~ and formulated to coat the interior of swimming pools and to resist swimming pool chemicals.

2.54~~1~~ Swimming Pool Repair and Maintenance Coating: A rubber based coating labeled ~~as~~ and formulated to be used over existing rubber based coatings for the repair and maintenance of swimming pools.

2.55~~2~~ Temperature-Indicator Safety Coating: A coating labeled and formulated as a color-changing indicator coating for the purpose of monitoring the temperature and safety of the substrate, underlying piping, or underlying equipment, and for application to substrates exposed continuously or intermittently to temperatures above 204°C (400°F).

2.56~~3~~ Tint Base: An architectural coating to which colorant is added after packaging in sale units to produce a desired color.

2.57~~4~~ Traffic Marking Coating: A coating labeled ~~as~~ and formulated for marking and striping streets, highways, or other traffic surfaces including, but not limited to, curbs, berms, driveways, parking lots, sidewalks, and airport runways.

2.58~~5~~ Undercoater: A coating labeled ~~as~~ and formulated to provide a smooth surface for subsequent coatings.

2.59~~6~~ Varnish: A clear or semi-transparent wood coating, excluding lacquers and shellacs, formulated to dry by chemical reaction on exposure to air. Varnishes may contain small amounts of pigment to color a surface, or to control the final sheen or gloss of the finish.

2.60~~57~~ Volatile Organic Compound (VOC): Any volatile compound containing at least one atom of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, and excluding the following:

2.60~~57~~.1 methane;
methylene chloride (dichloromethane);
1,1,1-trichloroethane (methyl chloroform);
trichlorofluoromethane (CFC-11);
dichlorodifluoromethane (CFC-12);
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113);
1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114);
chloropentafluoroethane (CFC-115);
chlorodifluoromethane (HCFC-22);
1,1,1-trifluoro-2,2-dichloroethane (HCFC-123);
2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124);
1,1-dichloro-1-fluoroethane (HCFC-141b);
1-chloro-1,1-difluoroethane (HCFC-142b);
trifluoromethane (HFC-23);
pentafluoroethane (HFC-125);
1,1,2,2-tetrafluoroethane (HFC-134);
1,1,1,2-tetrafluoroethane (HFC-134a);
1,1,1-trifluoroethane (HFC-143a);
1,1-difluoroethane (HFC-152a);
cyclic, branched, or linear completely methylated siloxanes;
the following classes of perfluorocarbons:
(A) cyclic, branched, or linear, completely fluorinated alkanes;
(B) cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;
(C) cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and
(D) sulfur-containing perfluorocarbons with no unsaturations and with the sulfur bonds only to carbon and fluorine; and

2.60~~57~~.2 the following low-reactive organic compounds which have been exempted by the U.S. EPA:
acetone;
ethane;
parachlorobenzotrifluoride (1-chloro-4-trifluoromethyl benzene);
perchloroethylene; and
methyl acetate.

2.61~~58~~ VOC Content: The weight of VOC per volume of coating, calculated according to the procedures specified in subsection 6.1.

2.62~~59~~ Waterproofing Wood Sealer: A coating labeled ~~as~~ and formulated for application to a ~~porous~~ wood substrate for the primary purpose of preventing the penetration of water.

2.63 Waterproofing Concrete/Masonry Sealer: A clear or pigmented film-forming coating that is labeled and formulated for sealing concrete and masonry to provide resistance against water, alkalis, acids, ultraviolet light, and staining.

2.64~~0~~ Wood Preservative: A coating labeled ~~as~~ and formulated to protect exposed wood from decay or insect attack, that is registered with both the U.S. EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (7 United States Code (U.S.C.) Section 136, *et seq.*) and with the California Department of Pesticide Regulation.

3. STANDARDS

3.1 **VOC Content Limits:** Except as provided in subsections 3.2, ~~and~~ 3.3, and 3.8, no person shall:~~, within the District,~~ (i) manufacture, blend, or repackage for sale within the district~~,~~; (ii) supply, sell, or offer for sale within the district; ~~sell, apply,~~ or (iii) solicit for ~~the~~ application or apply within the district, ~~of~~ any architectural coating with a VOC content in excess of the corresponding limit specified in Table 1, after the specified effective date in Table 1.

3.2 **Most Restrictive VOC Limit:** If anywhere on the container of any architectural coating, or any label or sticker affixed to the container, or in any sales, advertising, or technical literature supplied by a manufacturer or anyone acting on their behalf, any representation is made that indicates that the coating meets the definition of or is recommended for use for more than one of the coating categories listed in Table 1, then the most restrictive VOC content limit shall apply. This provision does not apply to the coating categories specified in subsections 3.2.1 through 3.2.~~13~~14.

3.2.1 Lacquer coatings (including lacquer sanding sealers ~~but excluding lacquer stains~~).

3.2.2 Metallic pigmented coatings.

3.2.3 Shellacs.

3.2.4 Fire-retardant coatings.

3.2.5 Pretreatment wash primers ~~that also meet the definition for industrial maintenance coatings are subject only to the VOC content limit in Table 1 for pretreatment wash primers~~.

3.2.6 Industrial maintenance coatings.

3.2.7 Low-solids coatings.

3.2.8 Wood preservatives.

3.2.9 High temperature coatings.

3.2.10 Temperature-indicator safety coatings.

3.2.11 Antenna coatings.

3.2.12 Antifouling coatings.

3.2.13 Flow coatings.

3.2.14 Bituminous roof primers.

3.3 **Sell-Through of Coatings:** A coating manufactured prior to the effective date specified for that coating in Table 1 may be sold, supplied, or offered for sale for up to three years after the specified effective date. In addition, a coating manufactured before the effective date specified for that coating in Table 1 may be applied at any time, both before and after the specified effective date, so long as the coating complied with the standards in effect at the time the coating was manufactured. This subsection 3.3 does not apply to any coating that does not display the date or date-code required by subsection 4.1.1.

3.4 **Painting Practices:** All architectural coating containers used to apply the contents therein to a surface directly from the container by pouring, siphoning, brushing, rolling, padding, ragging or other means, shall be closed when not in use. These architectural coating containers include, but are not limited to, drums, buckets, cans, pails, trays or other application containers. Containers of any VOC-containing materials used for thinning and cleanup shall also be closed when not in use. ~~"Not in use" includes, but is not limited to, any interruption, delay, completion of transfer of the contents, or termination of the application.~~

3.5 **Thinning:** No person who applies or solicits the application of any architectural coating shall apply a coating that is thinned to exceed the applicable VOC limit specified in Table 1.

~~3.6~~ ~~**Industrial Maintenance Coatings:** Any person who applies or solicits the application of any architectural coating within the District shall follow the manufacturer's recommendation regarding the application of industrial maintenance coatings as described in subsection 4.1.4. Effective January 1, 2004, no person who applies or solicits the application of any architectural coating shall apply an industrial maintenance coating in or on a residence as defined in subsection 2.39 or in or on areas of industrial, commercial, or institutional facilities not exposed to the extreme environmental conditions identified in subsection 2.25, such as office space and meeting rooms.~~

3.6~~7~~ **Rust Preventative Coatings:** Effective January 1, 2004, no person shall apply or solicit the application of any rust preventative coating for industrial use, unless such a rust preventative coating complies with the industrial maintenance coating VOC limit specified in Table 1.

3.7~~8~~ **Coatings Not Listed in Table 1:** For any coating that does not meet any of the definitions for the specialty coatings categories listed in Table 1, the VOC content limit shall be determined by classifying the coating as a flat coating or a nonflat coating, based on its gloss, as defined in subsections 2.20~~19,~~ ~~and~~ 2.33~~2~~, and 2.34 and the corresponding flat or nonflat VOC limit shall apply.

3.8 **Industrial Maintenance Coatings:**

3.8.1 After January 1, 2004, a manufacturer, seller, or user may petition the APCO to apply an industrial maintenance coating with a VOC content up to 340 g/l if all of the following conditions are met:

3.8.1.1 The industrial maintenance coating is to be applied in a district located within the North Central Coast, San Francisco Bay Area, or North Coast Air Basins.

3.8.1.2 The petition submitted to the APCO contains the following information, as applicable: job requirements and description, volume of coating, maximum VOC content, and a certification that a complying coating meeting the job performance requirements is not available.

3.8.1.3 If the APCO grants written approval, such approval shall contain volume and VOC limit conditions. Until written approval is granted by the APCO and received by the petitioner, all provisions of this rule shall apply.

3.8.2 The APCO shall not approve any petition under subsection 3.8.1 if the approvals previously granted by the APCO during the calendar year, when combined with the petition under consideration, would result in excess VOC emissions for that calendar year which would be greater than 5 percent of the annual emission reduction achieved within the district from implementing the January 1, 2004, VOC limit for industrial maintenance coatings.

3.8.3 This provision shall not apply to industrial maintenance coatings that are for retail sale.

4. CONTAINER LABELING REQUIREMENTS

4.1 Each manufacturer of any architectural coating subject to this rule shall display the information listed in subsections 4.1.1 through 4.1.8~~7~~ on the coating container (or label) in which the coating is sold or distributed.

4.1.1 **Date Code:** The date the coating was manufactured, or a date code representing the date, shall be indicated on the label, lid, or bottom of the container. If the manufacturer uses a date code for any coating, the manufacturer shall file an explanation of each code with the Executive Officer of the ARB.

4.1.2 **Thinning Recommendations:** A statement of the manufacturer's recommendation regarding thinning of the coating shall be indicated on the label or lid of the container. This requirement does not apply to the thinning of architectural coatings with water. If thinning of the coating prior to use is not necessary, the recommendation must specify that the coating is to be applied without thinning.

4.1.3 **VOC Content:** Each container of any coating subject to this rule shall display either the maximum or the actual VOC content of the coating, as supplied, including the maximum thinning as recommended by the manufacturer. VOC content shall be displayed in grams of VOC per liter of coating. VOC content displayed shall be calculated using product formulation data, or shall be determined using the test methods in subsection 6.2. The equations in subsection 6.1 shall be used to calculate VOC content.

4.1.4 **Industrial Maintenance Coatings:** In addition to the information specified in subsection 4.1.1, 4.1.2, and 4.1.3, each manufacturer of any industrial maintenance coating subject to this rule shall display on the label or lid of the container in which the coating is sold or distributed one or more of the descriptions listed in subsections 4.1.4.1 through 4.1.4.3~~4~~.

4.1.4.1 "For industrial use only."
4.1.4.2 "For professional use only."
4.1.4.3 "Not for residential use" or "Not intended for residential use."
~~4.1.4.4 "This coating is intended for use under the following condition(s):" (Include each condition in subsections 4.1.5.4.1 through 4.1.5.4.5 that applies to the coating.)~~
~~4.1.4.4.1 Immersion in water, wastewater, or chemical solutions (aqueous and nonaqueous solutions), or chronic exposure of interior surfaces to moisture condensation;~~
~~4.1.4.4.2 Acute or chronic exposure to corrosive, caustic, or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;~~

~~4.1.4.4.3~~ ~~Repeated exposure to temperatures above 121°C (250°F);~~
~~4.1.4.4.4~~ ~~Repeated (frequent) heavy abrasion, including mechanical wear and repeated (frequent) scrubbing with industrial solvents, cleaners, or scouring agents; or~~
~~4.1.4.4.5~~ ~~Exterior exposure of metal structures and structural components.~~

4.1.5 **Clear Brushing Lacquers:** Effective January 1, 2003, the labels of all clear brushing lacquers ~~each container of this category~~ shall prominently display the statements ~~explicit label instructions that the product is~~ ~~formulated~~ “~~f~~For brush application only,” and ~~that~~ “This product must not be thinned or sprayed.” ~~thinning and/or spraying is not permitted.~~

4.1.6 **Rust Preventative Coatings:** Effective January 1, 2003, the labels of all rust preventative coatings shall prominently display ~~include~~ the statement “For Metal Substrates Only” ~~prominently displayed~~.

4.1.7 **Specialty Primers, Sealers, and Undercoaters:** Effective January 1, 2003, the labels of all specialty primers, sealers, and undercoaters shall prominently display one or more of the descriptions listed in subsection 4.1.7.1 through 4.1.7.5.

4.1.7.1 “For blocking stains ~~only~~.”
4.1.7.2 “For fire-damaged substrates ~~only~~.”
4.1.7.3 “For smoke-damaged substrates ~~only~~.”
4.1.7.4 “For water-damaged substrates ~~only~~.”
4.1.7.5 “For excessively chalky substrates ~~only~~.”

4.1.8 **Quick Dry Enamels:** Effective January 1, 2003, the labels of all quick dry enamels shall prominently display the words “Quick Dry” and the dry hard time.

4.1.9 **Non-flat - High Gloss Coatings:** Effective January 1, 2003, the labels of all non-flat - high gloss coatings shall prominently display the words “High Gloss.”

5. REPORTING REQUIREMENTS

5.1 **Clear Brushing Lacquers:** Each manufacturer of clear brushing lacquers shall, on or before April 1 of each calendar year beginning in the year 2004, submit an annual report to the Executive Officer of the ARB. The report shall specify the number of gallons of clear brushing lacquers sold in the State during the preceding calendar year, and shall describe the method used by the manufacturer to calculate State sales.

5.2 **Rust Preventative Coatings:** Each manufacturer of rust preventative coatings shall, on or before April 1 of each calendar year beginning in the year 2004, submit an annual report to the Executive Officer of the ARB. The report shall specify the number of gallons of rust preventative coatings sold in the State during the preceding calendar year, and shall describe the method used by the manufacturer to calculate State sales.

5.3 **Specialty Primers, Sealers, and Undercoaters:** Each manufacturer of specialty primers, sealers, and undercoaters shall, on or before April 1 of each calendar year beginning in the year 2004, submit an annual report to the Executive Officer of the ARB. The report shall specify the number of gallons of specialty primers, sealers, and undercoaters sold in the State during the preceding calendar year, and shall describe the method used by the manufacturer to calculate State sales.

5.4 **Toxic Exempt Compounds:** For each architectural coating that contains perchloroethylene or methylene chloride, the manufacturer shall, on or before April 1of each calendar year beginning with the year 2004, report to the Executive Officer of the ARB the following information for products sold in the State during the preceding year:

5.4.1 the product brand name and a copy of the product label with legible usage instructions;
5.4.2 the product category listed in Table 1 to which the coating belongs;
5.4.3 the total sales in California during the calendar year to the nearest gallon;
5.4.4 the volume percent, to the nearest 0.10 percent, of perchloroethylene and methylene chloride in the coating.

5.5 **Recycled Coatings:** Manufacturers of recycled coatings must submit a letter to the Executive Officer of the ARB ~~Air Resources Board~~ certifying their status as a Recycled Paint Manufacturer. The manufacturer shall, on or before April 1 of each calendar year beginning with the year 2004, submit an annual report to the Executive Officer of the ARB. The report shall include, for all recycled coatings, the total number of gallons distributed in the State ~~California~~ during the preceding year, and shall describe the method used by the manufacturer to calculate State distribution.

5.6 **Bituminous Coatings:** Each manufacturer of bituminous roof coatings or bituminous roof primers shall, on or before April 1 of each calendar year beginning with the year 2004, submit an annual report to the Executive Officer of ARB. The report shall specify the number of gallons of bituminous roof coatings or bituminous roof primers sold in the State during the preceding calendar year, and shall describe the method used by the manufacturer to calculate State sales.

6. COMPLIANCE PROVISIONS AND TEST METHODS

6.1 **Calculation of VOC Content:** For the purpose of determining compliance with the VOC content limits in Table 1, the VOC content of a coating shall be determined by using the procedures described in subsection 6.1.1 or 6.1.2, as appropriate. The VOC content of a tint base shall be determined without colorant that is added after the tint base is manufactured.

6.1.1 With the exception of low solids coatings, determine the VOC content in grams of

VOC per liter of coating thinned to the manufacturer's maximum recommendation, excluding the volume of any water and exempt compounds. Determine the VOC content using equation 1 as follows:

$$VOC\ Content = \frac{(W_s - W_w - W_{ec})}{(V_m - V_w - V_{ec})} \qquad (1)$$

Where:

VOC content = grams of VOC per liter of coating
W_s = weight of volatiles, in grams
W_w = weight of water, in grams
W_{ec} = weight of exempt compounds, in grams
V_m = volume of coating, in liters
V_w = volume of water, in liters
V_{ec} = volume of exempt compounds, in liters

6.1.2 For low solids coatings, determine the VOC content in units of grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, including the volume of any water and exempt compounds. Determine the VOC content using equation 2 as follows:

$$VOC\ Content_{ls} = \frac{(W_s - W_w - W_{ec})}{(V_m)} \qquad (2)$$

Where:

VOC content_{ls} = the VOC content of a low solids coating in grams of VOC per liter of coating
W_s = weight of volatiles, in grams
W_w = weight of water, in grams
W_{ec} = weight of exempt compounds, in grams
V_m = volume of coating, in liters

6.2 **VOC Content of Coatings:** To determine the physical properties of a coating in order to perform the calculations in subsection 6.1, the reference method for VOC content is U.S. EPA Method 24, incorporated by reference in subsection 6.5.11, except as provided in subsections 6.3 and 6.4. An alternative method to determine the VOC content of coatings is SCAQMD Method 304-91 (Revised February 1996), incorporated by reference in subsection 6.5.12. The exempt compounds content shall be determined by SCAQMD Method 303-91 (Revised August 1996), incorporated by reference in subsection 6.5.10. To determine the VOC content of a coating, the manufacturer may use U.S. EPA Method 24 , or an alternative method as provided in subsection 6.3, formulation data, or any other reasonable means for predicting that the coating has been formulated as intended (e.g., quality assurance checks, recordkeeping). However, if there are any inconsistencies between the results of a Method 24 test and any other means for determining VOC content, the Method 24 test results will govern, except when an alternative method is approved as specified in subsection 6.3. The District Air Pollution Control Officer (APCO) may require the manufacturer to conduct a Method 24 analysis.

6.3 **Alternative Test Methods:** Other test methods demonstrated to provide results that are acceptable for purposes of determining compliance with subsection 6.2, after review and approved in writing by the staffs of the District, the ARB, and the U.S. EPA, may also be used.

6.4 **Methacrylate Traffic Marking Coatings:** Analysis of methacrylate multicomponent coatings used as traffic marking coatings shall be conducted according to a modification of U.S. EPA Method 24 (40 CFR 59, subpart D, Appendix A), incorporated by reference in subsection 6.5.13. This method has not been approved for methacrylate multicomponent coatings used for other purposes than as traffic marking coatings or for other classes of multicomponent coatings.

6.5 **Test Methods:** ~~For coatings subject to the provisions of this rule, the following test methods shall be used:~~ The following test methods are incorporated by reference herein, and shall be used to test coatings subject to the provisions of this rule:

6.5.1 **Flame Spread Index:** The flame spread index of a fire-retardant coating shall be determined by ASTM Designation E 84-99, "Standard Test Method for Surface Burning Characteristics of Building Materials," ~~incorporated by reference in~~ (see section 2, Fire-Retardant Coating).

6.5.2 **Fire Resistance Rating:** The fire resistance rating of a fire-resistive coating shall be determined by ASTM Designation E 119-98, "Standard Test Methods for Fire Tests of Building Construction Materials," ~~incorporated by reference in~~ (see section 2, Fire-Resistive Coating).

6.5.3 **Gloss Determination:** The gloss of a coating shall be determined by ASTM Designation D 523-89 (1999), "Standard Test Method for Specular Gloss," ~~incorporated by reference in~~ (see section 2, Flat Coating, Nonflat Coating, Nonflat - High Gloss Coating, and Quick-Dry Enamel).

6.5.4 **Metal Content of Coatings:** The metallic content of a coating shall be determined by SCAQMD Method 318-95, "Determination of Weight Percent Elemental Metal in Coatings by X-Ray Diffraction," SCAQMD "Laboratory Methods of Analysis for Enforcement Samples," ~~incorporated by reference in~~ (see section 2, Metallic Pigmented Coating).

6.5.5 **Acid Content of Coatings:** The acid content of a coating shall be determined by ASTM Designation D 1613-96, "Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products," ~~incorporated by reference in~~ (see section 2, Pre-treatment

Wash Primer).

6.5.6 **Drying Times:** The set-to-touch, dry-hard, dry-to-touch, and dry-to-recoat times of a coating shall be determined by ASTM Designation D 1640- 95, “Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature,” ~~incorporated by reference in~~ (see section 2, Quick-Dry Enamel and Quick-Dry Primer, Sealer, and Undercoater). The tack-free time of a quick-dry enamel coating shall be determined by the Mechanical Test Method of ASTM Designation D 1640- 95.

6.5.7 **Surface Chalkiness:** The chalkiness of a surface shall be determined using ASTM Designation D 4214-98, “Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films,” ~~incorporated by reference in~~ (see section 2, Specialty Primer, Sealer, and Undercoater).

6.5.8 **Exempt Compounds--Siloxanes:** Exempt compounds that are cyclic, branched, or linear completely methylated siloxanes, shall be analyzed as exempt compounds for compliance with section 6 by BAAQMD Method 43, “Determination of Volatile Methylsiloxanes in Solvent-Based Coatings, Inks, and Related Materials,” BAAQMD Manual of Procedures, Volume III, adopted 11/6/96, ~~incorporated by reference in~~ (see section 2, Volatile Organic Compound, and subsection 6.2).

6.5.9 **Exempt Compounds--Parachlorobenzotrifluoride (PCBTF)**: The exempt compound parachlorobenzotrifluoride, shall be analyzed as an exempt compound for compliance with section 6 by BAAQMD Method 41, “Determination of Volatile Organic Compounds in Solvent Based Coatings and Related Materials Containing Parachlorobenzotrifluoride,” BAAQMD Manual of Procedures, Volume III, adopted 12/20/95, ~~incorporated by reference in~~ (see section 2,Volatile Organic Compound, and subsection 6.2).

6.5.10 **Exempt Compounds:** The content of compounds ~~E~~exempt ~~compounds content~~ under U.S. EPA Method 24 shall be analyzed by SCAQMD Method 303-91 (Revised 1993), “Determination of Exempt Compounds,” SCAQMD “Laboratory Methods of Analysis for Enforcement Samples,”~~ incorporated by reference in~~ (see section 2, Volatile Organic Compound, and subsection 6.2).

6.5.11 **VOC Content of Coatings:** The VOC content of a coating ~~is~~ shall be determined by U.S. EPA Method 24 as it exists in appendix A of 40 Code of Federal Regulations (CFR) part 60, “Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings,”~~ 1998, incorporated by reference in~~ (see subsection 6.2).

6.5.12 **Alternative VOC Content of Coatings:** The VOC content of coatings may be analyzed either by U.S. EPA Method 24 or SCAQMD Method 304-91 (Revised 1996), “Determination of Volatile Organic Compounds (VOC) in Various

Materials," SCAQMD "Laboratory Methods of Analysis for Enforcement Samples," ~~incorporated by reference in~~ (see subsection 6.2).

6.5.13 **Methacrylate Traffic Marking Coatings:** The VOC content of methacrylate multicomponent coatings used as traffic marking coatings shall be analyzed by the procedures in 40 CFR part 59, subpart D, appendix A, "Determination of Volatile Matter Content of Methacrylate Multicomponent Coatings Used as Traffic Marking Coatings," (September 11, 1998), ~~incorporated by reference in~~ (see subsection 6.~~2~~4).

Table 1
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS

Limits are expressed in grams of VOC per liter[a] of coating thinned to the manufacturer's maximum recommendation, excluding the volume of any water, exempt compounds, or colorant added to tint bases. "Manufacturer's maximum recommendation" means the maximum recommendation for thinning that is indicated on the label or lid of the coating container.

Coating Category	Effective 1/1/2003	Effective 1/1/2004
Flat Coatings	100	
Nonflat Coatings	150	
Nonflat - High Gloss Coatings	250	
Specialty Coatings		
Antenna Coatings	530	
Antifouling Coatings	400	
Bituminous Roof Coatings	~~250~~ 300	
Bituminous Roof Primers	350	
Bond Breakers	350	
Clear Wood Coatings • Clear Brushing Lacquers • Lacquers (including lacquer sanding sealers) • Sanding Sealers (other than lacquer sanding sealers) • Varnishes	 680 550 350 350	
Concrete Curing Compounds	350	
Dry Fog Coatings	400	
Faux Finishing Coatings	350	
Fire Resistive Coatings	350	
Fire-Retardant Coatings: • Clear • Opaque	 650 350	
Floor Coatings	~~100~~ 250	
Flow Coatings	420	
Form-Release Compounds	250	
Graphic Arts Coatings (Sign Paints)	500	
High Temperature Coatings	420	

Draft 5/22/00 compared to 2/11/00

Coating Category	**Effective 1/1/2003**	**Effective 1/1/2004**
Industrial Maintenance Coatings		250
Low Solids Coatings[b]	120	
Magnesite Cement Coatings	450	
Mastic Texture Coatings	300	
Metallic Pigmented Coatings	500	
Multi-Color Coatings	250	
Pre-Treatment Wash Primers	420	
Primers, Sealers, and Undercoaters	200	
Quick-Dry Enamels	250	
Quick-Dry Primers, Sealers, and Undercoaters	200	
Recycled Coatings	250	
Roof Coatings	250	
Rust Preventative Coatings	400	
Shellacs: • Clear • Opaque	 730 550	
Specialty Primers, Sealers, and Undercoaters	350	
Stains	250	
Swimming Pool Coatings	340	
Swimming Pool Repair and Maintenance Coatings	340	
Temperature-Indicator Safety Coatings	550	
Traffic Marking Coatings	150	
Waterproofing Sealers • Concrete/Masonry • Wood	~~250~~ 400 250	
Wood Preservatives	350	

[a] Conversion factor: one pound VOC per gallon (U.S.) = 119.95 ~~119.82~~ grams VOC per liter.

[b] Units are grams of VOC per liter (pounds of VOC per gallon) of coating, including water and exempt compounds.

APPENDIX B

NOTICE OF PREPARATION AND INITIAL STUDY

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
2020 L Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

June 11, 1999

SUBJECT: **NOTICE OF PREPARATION OF A DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT**

PROJECT TITLE: **SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS**

In accordance with the California Environmental Quality Act (CEQA), the Air Resources Board (ARB) is the Lead Agency and will prepare a Program Environmental Impact Report (EIR) for the project identified above. The proposed project is essentially a model rule (i.e., a Suggested Control Measure) which is designed to be considered for adoption by the local air pollution control and air quality management districts (districts) in California. Under California law, the districts have the primary legal authority for adopting control measures for architectural coatings. The adoption of the Suggested Control Measure (SCM) by the ARB will not impose binding requirements on the districts or on any other person. Binding requirements would only be imposed if one or more districts adopt the SCM as a district rule, which would then apply to affected persons within the jurisdiction of each district.

The SCM will reduce VOC emissions from certain architectural coatings, if one or more districts adopt it. The purpose of this Notice of Preparation (NOP) is to inform appropriate government agencies and the public that a Draft Program EIR is being prepared, and to solicit comments on the environmental areas within each agency's jurisdiction.

In conjunction with the development of the SCM, it is necessary to address the effects of the proposal on the environment. The ARB is preparing the appropriate environmental analyses in accordance with CEQA. The ARB plans to conduct its environmental impact analysis in the form of a Program EIR, which would then be available for use by each district that decides to adopt the SCM. This NOP serves two purposes: to solicit information on the scope of the environmental analysis for the proposed project and to notify the public that ARB will prepare a Draft Program EIR to assess potential environmental impacts that may result from the implementation of the SCM. If potential adverse impacts are identified, the Draft Program EIR will also discuss feasible mitigation measures to reduce potential significant adverse environmental impacts. The Draft Program EIR will also include a discussion of all other topics required by CEQA, as well as a range of reasonable project alternatives.

The attached materials do not require a response from you. Their purpose is simply to provide information to you on the above project. If the proposed project has no bearing on you or your organization, no action on your part is necessary.

The project's description, location, and potential environmental impacts are described in the Initial Study for the proposed project that is attached to this NOP. This NOP and Initial Study are available for a 30-day review and comment period. Comments focusing on your area of expertise, your agency's area of jurisdiction, or scope of the project alternatives should be addressed to Mr. Jim Nyarady, Manager, Strategy Evaluation Section, Stationary Source Division, at the address shown above, or sent by FAX to (916) 322-6088. Mr. Nyarady's telephone number is (916) 322-8273. Alternatively, comments may be sent via the Internet to jnyarady@arb.ca.gov. Comments must be received no later than 5:00 PM on July 22, 1999. Please include your name and phone number or the name and phone number of the contact person for your agency.

Copies of this NOP and Initial Study are available from the ARB's Public Information Office at the address shown above, and are also available on the ARB's Internet site at http://www.arb.ca.gov/arch/arch.htm.

Date: June 11, 1999 **Signature**:
Peter D. Venturini

Title: Chief, Stationary Source Division

Reference: California Code of Regulations, Title 14, §§15082(a), 15103, and 15375

California Environmental Protection Agency

Air Resources Board

INITIAL STUDY

FOR THE

DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT

FOR A

SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

June 1999

CHAPTER 1 - PROJECT DESCRIPTION

CHAPTER 2 - ENVIRONMENTAL CHECKLIST

APPENDIX A - CALIFORNIA AIR DISTRICT RESOURCE DIRECTORY

APPENDIX B - SUMMARY OF CURRENT DISTRICT RULES & VOC LIMITS

APPENDIX C - SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

CHAPTER 1

PROJECT DESCRIPTION

INTRODUCTION

The proposed Suggested Control Measure (SCM) for Architectural Coatings is a "project" as defined by the California Environmental Quality Act (CEQA). The proposed project is essentially a model rule (i.e., a Suggested Control Measure) intended to reduce volatile organic compound (VOC) emissions from architectural coatings. The SCM is designed to be considered by the local air pollution control and air quality management districts (districts) in California when adopting or amending architectural coatings rules.

Under California law, the districts have the primary legal authority for adopting control measures for architectural coatings (see Health and Safety Code, §§39002, 40000, and 40001). The approval of the SCM by the Air Resources Board (ARB) will not impose binding requirements on any person. Binding requirements will only be imposed if one or more districts decide to adopt the SCM as a district rule. Upon adoption, a district rule would then apply to affected persons within the jurisdiction of the district. In addition, approval of the SCM by the ARB will not impose an obligation on any district to subsequently adopt the SCM. It will be up to each district to decide if adoption of the SCM as a district rule is needed to attain the state and federal ambient air quality standards within the district.

Both CEQA and ARB policy require the ARB to evaluate the potential adverse environmental impacts of proposed projects. CEQA also requires that methods to reduce or avoid identified significant adverse environmental impacts of a project be implemented if feasible. The purpose of the Draft Program Environmental Impact Report (EIR) is to inform public agencies and interested parties of potentially significant adverse environmental impacts associated with the implementation of the proposed project.

California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report, once the Secretary of the Resources Agency has certified the regulatory program. The Secretary of Resources has certified the portion of the ARB's regulatory program "… which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans to be used in the regulatory program for the protection and enhancement of ambient air quality in California." (see title 14, California Code of Regulations (CCR), §15251(d)). The adoption of the SCM is within the scope of this certification, which would allow the ARB to include the environmental analysis for the SCM in an ARB Staff Report instead of preparing a formal environmental impact report or negative declaration (see title 17, CCR, §§60005 to 60007).

Instead of placing the environmental analysis in an ARB Staff Report, however, the ARB believes that a Program EIR format would be more useful to districts that choose to adopt the SCM. When a district decides to adopt the SCM as a local district rule, the district will need to determine how to comply with CEQA. One possibility would be for each district to prepare its own new project EIR for the district version of the SCM. But a new project EIR prepared by each district would require a large expenditure of resources, and would likely substantially duplicate the ARB's environmental impact analysis for what is essentially the same project. To avoid such duplication, the CEQA Guidelines (see title 14, CCR, §15168) allow a lead agency to prepare a Program EIR for a series of actions that can be characterized as one large project and are related either: (1) geographically, (2) as logical parts in a chain of contemplated actions, or (3) in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program.

For projects such as the ARB's SCM, which are specifically designed to be subsequently adopted by the districts as a local district rules, an environmental analysis in the form of a Program EIR provides the CEQA framework that can be relied upon by the districts when adopting ARB's SCM. Under the general principles of CEQA, the districts may use a similar environmental assessment prepared under the ARB's certified regulatory program in the same way that a Program EIR could be used. However, the precedent of using a Program EIR for this purpose is more clearly established in the CEQA Guidelines and case law, and the Program EIR format may be more familiar to the districts and the regulated community. For this particular SCM, it is important that the districts be provided with an environmental analysis format that will be consistent with, and more easily incorporated into, their own CEQA compliance process. Using a Program EIR format will accomplish this goal.

In preparing the Program EIR for ARB's SCM, the ARB will follow the procedural and substantive requirements for a Program EIR even though the ARB is not legally required to use this particular format. The Program EIR will be designed to specifically and comprehensively address the environmental impacts associated with the Architectural Coatings SCM in accordance with CEQA, so that the districts, if they choose to do so, may rely on the analysis in the Program EIR when adopting or amending their architectural coatings rules.

The ARB intends that each district may rely on the Program EIR by incorporating it by reference in whatever CEQA documents a district chooses to prepare for its own architectural coating rule. For example, a district could use the ARB's SCM Program EIR to provide the basis for an initial study for determining whether the district's version of the SCM may have any significant effects (see title 14, CCR §15168(d)). The district might then decide to prepare a negative declaration (if the district believes that the Program EIR appropriately analyzes the environmental impacts of adopting the SCM in that district), or a focused EIR (if, for example, the district believes that additional analysis may be necessary beyond the analysis contained in the Program EIR, in order to address factors that are specific to the individual district and may not have been fully considered in the Program EIR). These examples are not intended to dictate how a district may use the ARB's SCM Program EIR. It will be up to each district to decide on the best way to comply with CEQA in their particular circumstances. The ARB's SCM Program EIR will simply be available for whatever use the district feels is appropriate.

This Initial Study is intended to provide information about the proposed project to other public agencies and interested parties prior to the release of the Draft Program EIR. The Initial Study is being released for a 30-day review period. Written comments on the scope of the environmental analysis and possible project alternatives received by the ARB during the 30-day review period will be considered when preparing the Draft Program EIR.

PROJECT LOCATION

As mentioned above, the SCM is designed as a model rule to be adopted by the local districts throughout the state of California. There are 35 individual districts in California. (The addresses and phone numbers of each district are shown in Appendix A. The geographical boundaries of each district are shown on Figure 1-1.) If a district decides to adopt the SCM in the future, the district's version of the SCM would apply to affected persons within the geographical boundaries of that district.

The districts were created by the California Legislature as the public agencies responsible for developing and enforcing air pollution control regulations in the areas within their respective jurisdictions. By statute, districts are required to adopt or amend and enforce rules that will reduce air pollutant emissions in order to attain and maintain federal and state ambient air quality standards.

BACKGROUND

Air Quality in California

Although significant strides have been made in improving California's air quality, California still experiences the worst air quality in the nation for two pollutants of concern – ozone and particulate matter. To protect California's population from the harmful effects of both these pollutants, federal and state air quality standards have been set for ozone and PM_{10} (particulate matter less than 10 microns equivalent aerodynamic diameter). It should be noted that there are no state or federal ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because emissions contribute to the formation of both ozone and PM_{10}.

While health-based ambient air quality standards have not been established for VOCs, numerous VOCs have been identified as toxic air contaminants (TACs) and are regulated through ARB's TAC control program. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen. In addition, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations.

Ozone -
Ozone is formed in the atmosphere through photochemical reactions of VOC, oxides of nitrogen (NOx), and other hydrocarbon materials with sunlight. Ozone is a deep lung irritant, causing air passages to become inflamed and swollen. Health effects associated with exposure to ozone pollution include an increase in the frequency and severity of asthma attacks, breathing and respiratory problems, loss of lung function, and damage to lung tissue.

Figure 1-1


California Air Districts and Counties
Air Districts are Delineated by Bold Black Text Labels and Grey Boundary Lines.
Counties are Delineated by Smaller Text Labels and Black Boundary Lines.
N
W
E
S
DEL NORTE
Siskiyou
SISKIYOU
Modoc
MODOC
North Coast Unified
Shasta
SHASTA
Lassen
LASSEN
HUMBOLDT
TRINITY
Tehama
TEHAMA
PLUMAS
Northern Sierra
Mendocino
Glenn
GLENN
Butte
BUTTE
SIERRA
MENDOCINO
Colusa
COLUSA
Feather River
YUBA
SUTTER
NEVADA
Placer
PLACER
Lake
LAKE
Yolo Solano
YOLO
El Dorado
EL DORADO
ALPINE
Northern Sonoma
SONOMA
NAPA
SACRAMENTO
SOLANO
Amador
AMADOR
Calaveras
CALAVERAS
Sacramento Metro
MARIN
CONTRA COSTA
SAN JOAQUIN
Tuolumne
TUOLUMNE
MONO
SAN FRANCISCO
ALAMEDA
STANISLAUS
Mariposa
MARIPOSA
Bay Area
SAN MATEO
SANTA CLARA
MERCED
Great Basin Unified
SANTA CRUZ
MADERA
Monterey Bay Unified
SAN BENITO
San Joaquin Valley Unified
FRESNO
INYO
TULARE
MONTEREY
KINGS
San Luis Obispo
SAN LUIS OBISPO
KERN
Kern
Mojave Desert
SAN BERNARDINO
SANTA BARBARA
Antelope Valley
Santa Barbara
VENTURA
LOS ANGELES
Ventura
RIVERSIDE
ORANGE
South Coast
Imperial
IMPERIAL
San Diego
SAN DIEGO
0
50
100
150
200 Miles
California Environmental Protection Agency
Air Resources Board

PM_{10} –
Unlike ozone, which is a single chemical compound, particulate matter is a complex mixture of many different species generated from a wide array of sources. Particulate matter can be either directly emitted into the air in forms such as dust and soot, or it can be formed in the atmosphere (like ozone) from the reaction of gaseous precursors such as NOx, sulfur oxides (SOx), VOCs, and ammonia. PM_{10} can pass the human body's natural defense mechanism and be inhaled into the lungs. Health effects associated with exposure to particle pollution include an increase in the frequency and severity of asthma attacks, aggravation of bronchitis, reduced lung function in children, and premature death for people with existing respiratory and cardiac problems.

The vast majority of California's population who live in urban areas breathe unhealthy air for much of the year, as shown in Figure 1-2. Forty-six counties are currently designated as nonattainment for the state ozone standard, while 54 counties are designated as nonattainment for the state PM_{10} standard (ARB, "Proposed Amendments to the Designation Criteria and Amendments to the Area Designations for State Ambient Air Quality Standards, and Proposed Maps of the Area Designations for State and National Ambient Air Quality Standards," August 1998). These counties contain over 97 and 99 percent, respectively, of California's population, a clear indication of the extent and magnitude of the ozone and PM_{10} problems in California.

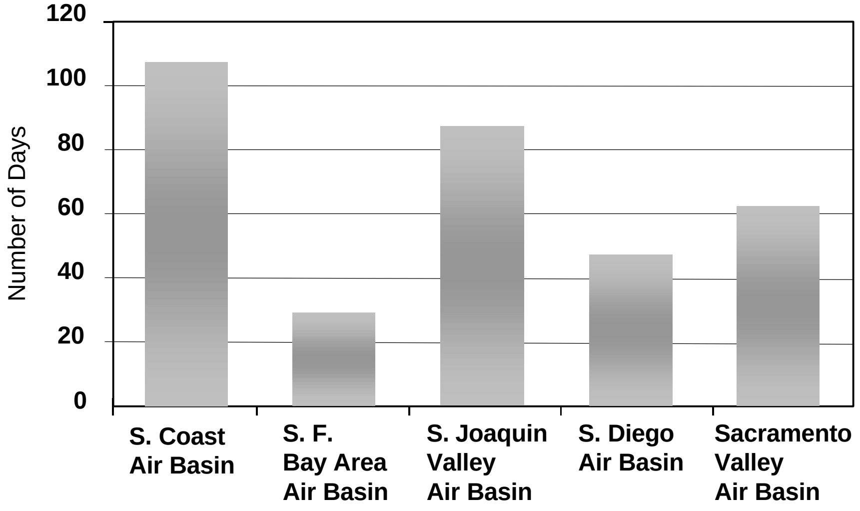
The California Clean Air Act requires districts that have been designated nonattainment for the State ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide to prepare and submit plans for attaining and maintaining the standards (see Health and Safety Code §40910 et seq.). In addition, the federal Clean Air Act requires that districts designated nonattainment for the federal ambient air quality standards prepare State Implementation Plans to demonstrate attainment with the federal standards. In some of these districts, substantial additional emission reductions will be necessary if attainment is to be achieved. In developing their plans, each district determines which measures are necessary to include, as well as the specific details of each included measure. The SCM will be available for consideration by each district for inclusion in the district's state and federal plans.

District Architectural Coatings Rules

VOC emissions from architectural coating operations are currently regulated by a number of local district rules. Under these rules, emissions are controlled by limiting the VOC content, measured in grams per liter, of the architectural coatings sold and applied in the district. A table of the current district rules, including the applicable VOC limits, is included as Appendix B. Architectural coatings are defined by their application and use, and include coatings that are applied to stationary structures such as residential and commercial buildings; billboards; curbs and roads; and mobile homes. VOCs are emitted to the atmosphere from the evaporation of organic solvents used in coatings. Most of these current district rules, as well as the proposed SCM, apply to those persons who supply, sell, apply, solicit the application of, or manufacture such coatings.

Some of the limits in these existing rules were based on the ARB's 1989 SCM for architectural and industrial maintenance coatings. A consortium of California air pollution control districts,

Number of Days the State Ozone Standard was Exceeded in 1998



Calculated Number of Days the State 24-hour PM_{10} Standard was Exceeded in 1997

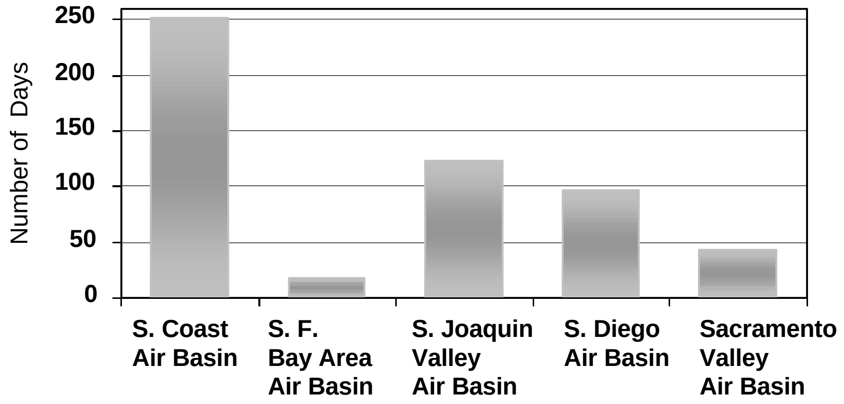


Figure 1-2

the ARB, U. S. Environmental Protection Agency Region IX, and paint manufacturers developed the provisions in the 1989 SCM. The proposed SCM will revise and update the 1989 SCM to reflect developments in coatings technology that have occurred since 1989.

PROJECT DESCRIPTION

The primary objective of the proposed SCM is to set VOC limits and other requirements that are feasible (based on existing and currently developing coatings technology) and that will achieve significant reductions in VOC emissions from architectural coatings. The SCM is also intended to serve as a model rule that will improve the clarity and enforceability of existing district architectural coatings rules, and provide a basis for uniformity among architectural coatings rules in California.

The proposed project is essentially a model rule (i.e., a Suggested Control Measure) that is designed to reduce VOC emissions from architectural coatings. The proposed SCM sets allowable VOC content limits for a number of architectural coating categories, including categories such as flats, non-flats, industrial maintenance, lacquers, floor, roof, rust preventative, stains, bituminous, quick-dry enamels, and primers, sealers, and undercoaters. The proposed VOC limits would become effective at various dates between 7/1/2001 and 7/1/2008, depending on the coating category. Other components of the proposed SCM include a three-year “sell-through” provision (for coatings manufactured before the applicable effective dates), definitions, test methods, standards for painting practices and thinning of coatings, and container labeling requirements. The draft language of the proposed SCM, and a discussion of the SCM’s probable environmental effects, can be found in the Initial Study. For the complete text of the proposed SCM, please see Appendix C of this Initial Study.

PROJECTED EMISSION REDUCTIONS

Implementation of the proposed SCM throughout the state is currently estimated to result in over 30 tons per day of VOC emission reductions on an annual average inventory basis and over 35 tons per day on the summer planning inventory basis by the year 2010. Table 1-1 summarizes the currently proposed VOC limits and the associated projected emission reductions. These estimates could change, as additional data become available.

ALTERNATIVES

The Draft Program EIR will discuss and compare alternatives to the proposed project that may avoid or reduce potentially significant effects and that feasibly attain the basic objectives of the proposed project. The purpose of the discussion of alternatives is to foster informed decision making and public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative. The ARB encourages the public and affected agencies to provide any comments on the type of alternatives that should be considered in the Draft Program EIR.

Table 1-1

Proposed SCM VOC Limits and Associated Estimated Emission Reductions

Category	2001/02 Limits (grams/liter)	South Coast Reductions (tons/day)	Rest of State Reductions (tons/day)	2005/06/08 Limits (grams/liter)	South Coast Reductions (tons/day)	Rest of State Reductions (tons/day)
Flats	100	NA	1.41	50	NA	2.80
Non-flats	150	NA	1.87	50	NA	4.52
Bituminous	50	0.75	0.91	--	--	--
Lacquers	550	NA	0.98	275	NA	0.86
Fire-retardant	250	0	0	--	--	--
Floor	100	NA	0.28	50	NA	0.12
Graphic arts	150	0	0	--	--	--
Industrial maintenance	250	NA	3.01	100	NA	2.59
Mastic texture	250	0	0	--	--	--
Multi-color	250	NA	0.01	--	--	--
Pre-treatment wash primers	250	0	0	--	--	--
Primers, sealers, and undercoaters	200	NA	4.80	100	NA	1.50
Quick-dry enamels	250	NA	1.04	50	NA	0.81
Roof	50	0.13	0.15	--	--	--
Rust preventative	250	0.04	0.06	100	NA	0.09
Shellac-clear	650	0	0	--	--	--
Stains-clear and semi-transparent	250	NA	0.53	--	--	--
Stains-opaque	150	0.16	0.19	--	--	--
Traffic	150*	NA	0.42	--	--	--
Waterproofing sealers-wood	250	NA	0.40	--	--	--
TOTALS		**1.08**	**16.06**		**0**	**13.29**

NA Not applicable since SCAQMD already has these limits in place

* This limit is effective in September 1999 under the National Rule

Some alternatives that are under consideration for inclusion in the Draft Program EIR are summarized below.

- Low Vapor Pressure Exemption - Under this alternative, VOC compounds with low vapor pressures may be exempted as a VOC from the overall VOC content of the coating.
- Performance-based standards - Emission standards would be based on VOC emissions per area covered per year rather than VOC content of the coatings.
- Reactivity - VOC emission limits would be based on the ozone reactivity of affected coatings' VOC compounds rather than the VOC content of the coating.
- Product Line Averaging - Rather than a coating manufacturer having to meet a specific VOC content limit for each specific product line, this alternative would allow averaging for all product lines.
- Regional Deregulation – Architectural coatings could be exempt from regulation in geographically distinct areas where local VOC emissions have no potential to contribute significantly to ozone levels.
- Seasonal Approach - Low-VOC content limits for various coatings would only be in effect during the "high ozone season" (i.e., typically the summer months). During the "low ozone season" (i.e., typically the winter months), affected coatings with higher VOC content limits could be used.
- VOC Content Limits/Final Compliance Deadlines - The proposed VOC content limits and/or final compliance deadlines as shown above in Table 1-1 may be modified.

Written suggestions on project alternatives received during the comment period for the Notice of Preparation and Initial Study will be considered when preparing the Draft Program EIR.

INITIAL ENVIRONMENTAL EVALUATION

Chapter 2 of this Initial Study contains an environmental checklist that was prepared to identify potentially significant adverse environmental impacts, and will determine the scope of the analysis in the Draft Program EIR. Items checked as having a "Potentially Significant Impact" will be analyzed further in the Draft Program EIR.

CHAPTER 2

ENVROMENTAL CHECKLIST

Introduction

General Information

Potentially Significant Impact Areas

Determination

Environmental Checklist and Discussion

INTRODUCTION

The environmental checklist provides a standard evaluation tool to identify a project's adverse environmental impacts. A sample checklist form is provided in the State CEQA Guidelines, Appendix G. The checklist presented in this document is a slightly modified form of the Appendix G checklist, but it still addresses all areas identified in the Appendix G checklist. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the proposed project.

GENERAL INFORMATION

Name of Proponent:	Air Resources Board
Address of Proponent:	2020 L Street Sacramento, California 95814
Lead Agency:	Air Resources Board
Contact Person	Mr. Jim Nyarady (916) 322-8273
Name of Project:	Suggested Control Measure for Architectural Coatings

POTENTIALLY SIGNIFICANT IMPACT AREAS

The environmental areas marked with an "✓" (checkmark) have the potential to be adversely affected by the proposed project. A checkmark of potentially significant impact does not mean the proposed project will have a significant impact but requires further evaluation, which may lead to an ultimate determination of no significant impact. An explanation relative to the determination of each of the areas can be found in the expanded checklist that follows.

☐ Land Use and Planning
☐ Pop./Housing
☐ Geophysical
☑ Water
☑ Air Quality
☑ Transportation/ Circulation
☐ Biological Resources
☐ Energy/Mineral Resources
☑ Hazards
☐ Noise
☑ Public Services
☑ Solid Waste/ Hazardous Waste
☐ Aesthetics
☐ Cultural Resources
☐ Recreation
☑ Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☑ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a “potentially significant impact” or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date: June 11, 1999 Signature:__________________________________

Peter D. Venturini, Chief
Stationary Source Division

ENVIRONMENTAL CHECKLIST AND DISCUSSION

	Potentially Significant Impact	**No Impact**
I. LAND USE AND PLANNING. Would the proposal:		
a) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☑
b) Conflict with any applicable habitat conservation or natural community conservation plan?	☐	☑
c) Affect agricultural resources or operations (e.g., impacts to soils or farmlands, or impacts from incompatible land uses)?	☐	☑
d) Physically divide an established community (including a low-income or minority community)?	☐	☑

Discussion:
Implementing the proposed SCM will not cause significant adverse impacts to land uses or land use planning in the state. It is anticipated that increased activities, if any, would occur at existing facilities or sites. Thus, no new resources or facilities are expected to be constructed which would result in any land use impacts.

No new development or alterations to existing land use designations will occur as a result of the implementation of the proposed SCM. It is not anticipated that the use of compliant SCM coatings throughout the state would require additional land to continue current operations or require rezoning. Therefore, no significant adverse impacts affecting existing or future land uses are expected.

Present or planned land uses in the state will not be affected as a result of the proposed SCM. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed SCM.

	Potentially Significant Impact	**No Impact**
II. POPULATION AND HOUSING. Would the proposal:		
a) Induce substantial growth in an area either directly or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure)?	☐	☑
b) Displace substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere?	☐	☑

Discussion:
Human population in the state is anticipated to grow regardless of implementing the proposed SCM. Further, the proposed SCM is not expected to result in the creation of any industry that would affect population growth, or directly or indirectly induce the construction of single- or multiple-family units. The proposal will primarily affect the formulation of architectural coatings and is not anticipated to generate any significant effects, either direct or indirect, on the state’s population as no additional workers are anticipated to be required to comply with the proposed SCM. Further, the SCM is not expected to cause a relocation of population within the state. As a result, housing in the state is expected to be unaffected by the proposed amendments. New housing construction is not expected to be affected by the use of lower-VOC coatings.

Additionally, adoption of the SCM is not expected to contribute to any significant housing cost increases because low-VOC coatings are currently being sold at prices comparable to "traditional" higher-VOC coatings. Direct economic impacts are not required to be analyzed pursuant to CEQA unless they also have a significant, direct effect on physical environmental parameters. Cost impacts associated with implementation of the SCM will be discussed in the Economic Impact Analysis, which will be prepared as part of the ARB Staff Report for the proposed SCM.

	Potentially Significant Impact	**No Impact**
III. GEOPHYSICAL. Would the proposal:		
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic–related ground failure, or landslides?	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☑

c) Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☑

Discussion:
Architectural coatings are applied to buildings, stationary structures, roads, etc. The proposed SCM VOC content limits affect coating formulators and have no effects on geophysical formations in the state. There are no provisions in the proposed SCM that would call for the disruption or overcovering of soil, changes in topography or surface relief features, the erosion of beach sand, or a change in existing siltation rates. Additionally, since add-on control equipment will not be used to reduce VOC emissions from architectural coatings, the SCM is not expected to result in additional exposure of people or property to geological hazards such as earthquakes, landslides, mudslides, ground failure, or other natural hazards.

	Potentially Significant Impact	**No Impact**
IV. WATER. Would the proposal:		
a) Violate any water quality standards or waste discharge requirements?	☑	☐
b) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☑	☐
c) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?	☐	☑
d) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in erosion or flooding on- or off-site?	☐	☑
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☑	☐
f) Otherwise substantially degrade water quality?	☑	☐

g) Require or result in the construction of new water, wastewater treatment facilities, stormwater drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☑
h) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☑	☐
i) Result in a determination by the wastewater treatment provider that serves or may serve the project's projected demand in addition to the provider's existing commitments?	☑	☐

Discussion:
Many architectural resin manufacturers and coatings formulators are expected to meet the lower VOC content limits in the SCM by reformulating or substituting VOC-containing materials with other substances (e.g., water-based, nontoxic, and/or VOC-free materials). The expanded use of reformulated materials to replace VOC- containing materials has the potential to adversely affect both water demand and water quality (e.g., surface water and groundwater). As the production of water-based materials increases, for example, there could be a greater demand for water from those industries that manufacture the water-based materials. In addition, use of water-based coatings may generate increased amounts of wastewater from coating applications. Water used for equipment cleanup and unused product may contain hazardous materials in excess of levels permitted in wastewater discharges. This wastewater may be discharged into storm drains and sanitary sewers and may, therefore, alter surface water quality. Additionally, wastewater from cleanup activities could be dumped on the ground, which may infiltrate into the water table, thus affecting groundwater quality. These water impacts will be evaluated in more detail in the Draft Program EIR.

	Potentially Significant Impact	**No Impact**
V. **AIR QUALITY.** Would the proposal:		
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☑
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☑
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☑
d) Expose off-site receptors to significant concentrations of hazardous air pollutants?	☑	☐

e) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☑
f) Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☑	☐
g) Create objectionable odors affecting a substantial number of people?	☑	☐

Discussion:
In connection with the development of the 1989 SCM and the adoption of various local district rules in which the VOC content limits of various coating categories were lowered, comments were received that estimated emission reductions would not be as great as originally anticipated for eight reasons, which are summarized below:

More Thickness
Coating formulators and coating contractors assert that reformulated compliant water- and solvent based coatings are very viscous (e.g., high-solids content) and difficult to handle during application, tending to produce a thick film when applied directly from the can. A thicker film indicates that a smaller surface area is covered with a given amount of material, thereby increasing VOC emissions per unit of area covered.

More Thinning
Because reformulated compliant water- and solvent-based coatings are more viscous (e.g., high-solids content), coating manufacturers and coating contractors assert that painters have to adjust the properties of the coatings to make them easier to handle and spread. Especially for solvent-based coatings, this adjustment consists of thinning the coating as supplied by the manufacturer by adding solvent to change the viscosity of the coating. The added solvent increases VOC emissions back to or sometimes above the level of older higher-VOC formulations. With water-based coatings, thinning should not be an issue because water is the solvent used to thin these coatings.

More Priming
Coating formulators and coating contractors assert that reformulated compliant water- and low-VOC solvent-based topcoats do not adhere as well as higher-VOC solvent-based topcoats to unprimed substrates. Therefore, the substrates must be primed with typical solvent-based primers to enhance topcoat adherence. Additionally, water-based sealers do not penetrate and seal porous substrates, like wood, as well as traditional solvent-based sealers. This results in three or four coats of the sealer per application compared to one coat for a high-quality solvent-based sealer.

More Topcoats
Coating formulators and coating contractors assert that reformulated compliant water- and low-VOC solvent-based topcoats may not cover, build, or flow-and-level as well as the solvent-based formulations. Therefore, more coats are necessary to achieve equivalent cover and coating build-up.

More Touch-Ups and Repair Work
Coating formulators and coating contractors assert that reformulated compliant water- and low-VOC solvent-based formulations dry slowly, and are susceptible to damage such as sagging, wrinkling, alligatoring, or becoming scraped and scratched. The high-solids solvent-based enamels tend to yellow in dark areas. Water-based coatings tend to blister or peel, and also result in severe blocking problems. All of these problems require additional coatings for repair and touch-up.

More Frequent Recoating
Coating manufacturers and coating contractors assert that the durability of the reformulated compliant water- and low-VOC solvent-based coatings is inferior to the durability of the traditional solvent-based coatings. Durability problems include cracking, peeling, excessive chalking, and color fading, which all typically result in more frequent recoating.

More Reactivity
Different types of solvents have different degrees of "reactivity," which is the ability to accelerate the formation of ground-level ozone. Coating formulators and coating contractors assert that the reformulated compliant water- and low-VOC solvent-based coatings contain solvents that are more reactive than the solvents used in higher-VOC solvent-based formulations. Furthermore, water-based coatings perform best under warm, dry weather conditions, and are typically recommended for use between May and October. Since ozone formation is also dependent on meteorological conditions, use of waterborne coatings during this period increases the formation of ozone.

Substitution
Coating formulators and coating contractors assert that since reformulated compliant water- and low-VOC solvent-based coatings are inferior in durability and are more difficult to apply, consumers and contractors will substitute better performing coatings in other categories for use in categories with low compliance limits. An example of this substitution could be the use of a non-flat coating (currently with a higher compliance limit) in place of a low-VOC, flat coating on interior drywall.

All of these issues will be analyzed in more detail in the Draft Program EIR.

In the past, comments were also received regarding secondary emissions from power plants providing power to special spray equipment used to apply reformulated coatings. It is not expected that current baseline emissions will increase because energy usage associated with providing power for special spray equipment used to apply reformulated coatings is expected to be negligible. Consequently, energy impacts are not considered to be significant. Therefore, secondary emissions from power plants are not expected to be significant and will not be evaluated further.

Toxics
The ARB has also received comments in the past that compliant low-VOC coatings are often formulated with toxic/hazardous compounds. As a result, material replacement or reformulation to reduce the use of high-VOC solvent-based coatings has the potential to result in health risks associated with exposure to both carcinogenic and non-carcinogenic (e.g., acute and chronic) toxic air contaminants. Material reformulation or substitution may result in increased use of acetone, a compound that has been designated as an exempt VOC by U.S. EPA and the proposed SCM. Since the proposed SCM does not define acetone as a VOC, there exists the potential for increased acetone use in reformulated coatings. Increased application of acetone-based coatings has the potential to increase objectionable odors. Toxic air impacts and potential odor impacts will be evaluated in more detail in the Draft Program EIR.

	Potentially Significant Impact	**No Impact**
VI. TRANSPORTATION/CIRCULATION. Would the proposal:		
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☑	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☑	☐
c) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☑
d) Result in inadequate emergency access?	☐	☑
e) Result in inadequate parking capacity?	☐	☑
f) Result in hazards or barriers for pedestrians or bicyclists?	☐	☑
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☑

Discussion:
The proposed SCM will not substantially increase the amount of businesses or equipment in the state. The main effect of the proposed limits will be to alter the way certain architectural coatings are manufactured. The SCM will not result in a substantial increase in vehicle trips throughout the entire state from the transportation of compliant water-based or low-VOC

solvent-based coatings. Even if more frequent application of compliant coatings may occur as a result of the implementation of the SCM, the frequency and concentration of daily trips to and from any one location in the state (e.g., manufacturer to distribution center or to retail painting store, contractor to retail painting store then to job site, or do-it-yourselfer to retail painting store then back home) is not expected to cause significant traffic impacts. Therefore, potential increases in traffic or alterations of traffic patterns are not anticipated from the manufacture and delivery of compliant coatings.

There is, however, the possibility of increased trips to landfills for the disposal of additional waste materials (coatings and containers) due to problematic performance characteristics (shelf life, pot life, and freeze/thaw) of certain low-VOC coatings formulations. These impacts will be evaluated in more detail in the Draft Program EIR.

Coating performance and durability issues will be discussed relative to potential indirect air quality impacts in the Air Quality Impacts section of the Draft Program EIR

	Potentially Significant Impact	**No Impact**
VII. BIOLOGICAL RESOURCES. Would the proposal:		
a) Have substantial adverse effects, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☑
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☑
c) Have a substantial adverse effect on federally protected wetlands as defined by § 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means?	☐	☑
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☑
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☑

f) Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☑

Discussion:
The SCM is not expected to adversely affect existing plant or animal species or communities, unique or endangered plant or animal species, or agricultural crops. Improvements in air quality from implementation of the SCM are expected to provide health benefits to plant and animal species as well as the human residents in the state. No significant adverse impacts to biological resources are expected to result from the proposed rule amendments because the SCM is expected to affect facilities in residential, industrial, or commercial areas where biological resources are already severely disturbed. The proposed SCM will not significantly affect growth or land use development in the region and, therefore, will not create significant adverse direct or indirect impacts to biological resources.

	Potentially Significant Impact	**No Impact**
VIII. ENERGY AND MINERAL RESOURCES. Would the proposal:		
a) Conflict with adopted energy conservation plans?	☐	☑
b) Use non-renewable resources in a wasteful and inefficient manner?	☐	☑
c) Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the State?	☐	☑
d) Result in the need for new or substantially altered power or natural gas utility systems?	☐	☑

Discussion:
Electricity
Because add-on control equipment is not expected to be used to comply with the provisions of the SCM, no additional energy use is expected to be required. Additionally, the SCM will not substantially increase the number of businesses or amount of equipment in the state. Furthermore, energy usage associated with providing power for any special spray equipment used to apply reformulated coatings is expected to be negligible. Consequently, energy impacts are not considered to be significant.

Natural Gas
The consumption of natural gas in the state is not expected to increase as a result of implementation of the SCM. Electricity will be the primary source of energy used to power the

spraying equipment operated at various sites. Consequently, natural gas energy impacts from implementing the SCM are not considered to be significant.

Fossil Fuels
The SCM is also expected not to substantial increase energy consumption from non-renewable resources (e.g., diesel and gasoline) above current state usage levels. Any incremental increase in fuel usage from trips associated with more frequent application of complaint coatings or waste disposal is expected to be negligible. There are sufficient supplies of gasoline and diesel to meet the small fuel demands associated with these potential trip increases. Therefore, fossil fuel energy impacts from implementing the SCM are not considered to be significant.

	Potentially Significant Impact	**No Impact**
IX. HAZARDS. Would the proposal:		
a) Create a significant hazard to the public or the environment through the routine transport, use, disposal, or other handling of hazardous materials?	☑	☐
b) Result in the handling of hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☑
c) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☑	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, create a significant hazard to the public or the environment?	☐	☑
e) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☑
f) Increase fire hazard in areas with flammable materials?	☑	☐

Discussion:
Risk of Upsets
Some coating manufacturers may elect to comply with the VOC content limits of the SCM by reformulating their coatings with acetone (exempt solvent). During past promulgation of local district coating and solvent rules, comments were received that acetone could result in hazards impacts (e.g., risk of fire or explosion) because of its flammability. Thus, the project-specific hazards impacts associated with the implementation of the SCM will be evaluated in more detail in the Draft Program EIR.

Human Health
Comments have also been received in the past that to meet some proposed VOC content limits, manufacturers would have to use hazardous solvents (i.e., glycol ethers –EGBE, diisocyanates, etc.) in their water-based reformulations. This, as the argument goes, would lead to human health impacts to workers and the public from their exposure to these compounds. Thus, the project-specific hazards impacts associated with the implementation of the SCM will be evaluated in more detail in the Draft Program EIR.

	Potentially Significant Impact	**No Impact**
X. NOISE. Would the proposal result in:		
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☑
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☑
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑

Discussion:
No significant noise impacts are anticipated by the implementation of the SCM. Coating formulators potentially affected by the proposed amendments are located in existing industrial or commercial areas. It is assumed that operations in these areas are subject to and in compliance with existing community noise standards. In addition to the noise generated by current operations, sources of noise in each district may include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses.

In general, the primary noise source at existing facilities is generated by vehicular traffic, such as trucks transporting raw materials to the facility, trucks hauling wastes away from the facility, trucks to recycle waste or other materials, and miscellaneous noise such as spray equipment (i.e., compressors, spray nozzles) and heavy equipment use (forklifts, trucks, etc.). Noise is generated during operating hours, which generally range from 6 a.m. to 5 p.m., Monday through Friday. The SCM is not expected to alter noise from existing noise generating sources.

Additionally, implementation of the SCM is not expected to result in significant noise impacts in residential areas. As with industrial or commercial areas, it is assumed that these areas are subject to local community noise standards. Contractors or do-it-yourselfers applying compliant coatings in residential areas are expected to comply with local community noise standards.

	Potentially Significant Impact	**No Impact**
XI. PUBLIC SERVICES. Would the proposal result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:		
a) Fire protection?	☑	☐
b) Police protection?	☐	☑
c) Schools?	☐	☑
d) Parks?	☐	☑
e) Other public facilities?	☐	☑

Discussion:
The SCM may result in the use of acetone to reformulate lower-VOC coatings. Acetone is a volatile, flammable liquid at room temperature. Therefore, fire protection impacts will be evaluated in more detail in the Draft Program EIR.

	Potentially Significant Impact	**No Impact**
XII. SOLID WASTE/HAZARDOUS WASTE. Would the proposal:		
a) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid and/or hazardous waste disposal needs?	☑	☐
b) Comply with federal, state, and local statutes and regulations related to solid and hazardous wastes?	☐	☑

Discussion:
With the use of water-based coatings to comply with the proposed lower-VOC content limits, it is possible that less solid waste will be deposited into landfills because some of the excess

water-based material can be recycled and reused. There is, however, the possibility of increased disposal of waste materials (coatings and containers) due to problematic performance characteristics (shelf life, pot life, and freeze/thaw) of certain low-VOC coatings formulations. Therefore, impacts of the proposed SCM on existing landfill capacity will be evaluated in more detail in the Draft Program EIR.

	Potentially Significant Impact	**No Impact**
XIII. AESTHETICS. Would the proposal:		
a) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☑
b) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☑
c) Create a new source of light or glare that would adversely affect day or nighttime views in the area?	☐	☑

Discussion:
The proposed SCM does not require any changes in the physical environment that would damage any resources of interest to the public. The reason for this determination is that any physical changes would occur at existing industrial or commercial sites. In addition, no new construction or major change to existing facilities, or stockpiling of additional materials or products outside of existing facilities, is expected to result. Likewise, additional light or glare would not be created since no light generating equipment would be required for implementation of the SCM. Therefore, no significant impacts adversely affecting existing scenic resources are anticipated to occur.

	Potentially Significant Impact	**No Impact**
XIV. CULTURAL RESOURCES. Would the proposal:		
a) Cause a substantial adverse change in the significance of a historical or archaeological resource as defined in CCR § 15064.5?	☐	☑
b) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☑
c) Disturb any human remains, including those interred outside a formal cemetery?	☐	☑

Discussion:
Significant adverse impacts to cultural resources are not expected because implementation of the proposed SCM would not require destruction or alteration of any buildings or sites with prehistoric, historic, archaeological, religious, or ethnic significance.

There are existing laws in place that are designed to protect and mitigate potential impacts to cultural resources. Should archaeological resources be found during the application of the SCM coatings to newly constructed structures or existing structures, the application of such coating would cease until a thorough archaeological assessment is conducted. Furthermore, the application of architectural coatings, in the vast majority of situations, would occur after construction where archaeological resources would have already been disturbed. The proposed SCM is, therefore, not anticipated to result in any activities or promote any programs that could have a significant adverse impact on cultural resources in the state.

	Potentially Significant Impact	**No Impact**
XV. RECREATION.		
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☑
c) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☑

Discussion:
No significant adverse impacts to recreational facilities are expected, for the same reasons outlined in Item I - Land Use and Planning, XIII - Aesthetics, and XIV - Cultural Resources.

XVI. MANDATORY FINDINGS OF SIGNIFICANCE.

	Potentially Significant Impact	**No Impact**
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☑
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	☑	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☑	☐

Discussion:
As a result of the possible adverse effects on air quality, water, hazards, transportation/circulation, solid/hazardous wastes and public services, the proposed project has the potential to degrade the quality of the environment. Many of the impacts are individually limited, but could be cumulatively significant. There may be adverse human health impacts associated with exposure to both carcinogenic and noncarcinogenic toxic air contaminants. These potential human health impacts may occur individually, such as elevated exposure to toxic air contaminants, or cumulatively, if different environmental impacts reinforce each other. These impacts will be evaluated in detail in the Draft Program EIR.

APPENDIX A

CALIFORNIA AIR DISTRICT RESOURCE DIRECTORY

California Air District Resource Directory

AMADOR COUNTY APCD
(all of Amador County)
500 Argonaut Lane
Jackson, CA 95642-2310
APCO - Karen Huss
Deputy APCO - Jim Harris
E-Mail: amaair@cdepot.net
Phone: (209) 223-6406
Fax: (209) 223-6260
Burn Line: (209) 223-6246

ANTELOPE VALLEY APCD
(NE portion of Los Angeles County)
43301 Division St., Ste. 206
P.O. Box 4409
Lancaster, CA 93539-4409
APCO - Charles L. Fryxell
Deputy APCO - Eldon Heaston
Reg. Development - Eldon Heaston
Surveillance - Bob Ramirez
Stationary Source - Chris Collins
Compliance - Doug Macauley
Business Assistance - Cynthia Ravenstein
Public Information Officer - Violette Roberts
Administrative Services - Jean Bracy
Website: http://www.mdaqmd.ca.gov
E-Mail: fwohosky@mdaqmd.ca.gov
Phone: (661) 723-8070
Fax: (661) 723-3450

BAY AREA AQMD
(Alameda, Contra Costa, Marin,
Napa, San Francisco, San Mateo,
Santa Clara, W portion of Solano,
S portion of Sonoma counties)
939 Ellis Street
San Francisco, CA 94109-7714
APCO - Ellen Garvey
Phone: (415) 749-4970
Deputy APCO - Peter Hess
Phone: (415) 749-4971
Deputy APCO - Vacant
Phone: (415) 749-4943
Enforcement - Jim Guthrie
Phone: (415) 749-4787
Fiscal/Admin - Vacant
Phone: (415) 749-4955
Legal - Robert Kwong
Phone: (415) 749-4750
Permits - Bill de Boisblanc
Phone: (415) 749-4704
Business Assistance - Vicki Dvorak
Phone: (415) 749-4764
Tech. Services - Gary Kendall
Phone: (415) 749-4932
Plan./Research - Tom Perardi
Phone: (415) 749-4667
Public Info. - Teresa Lee
Phone: (415) 749-4900
Complaint Line
Phone: (800) 334-6367
Website: http://www.baaqmd.gov
E-Mail: webmaster@baaqmd.gov
Phone: (415)771-6000
Fax: (415) 928-8560

BUTTE COUNTY AQMD
(all of Butte County)
2525 Dominic Drive, Suite J
Chico, CA 95928-7184
APCO - Larry Odle
Business Assistance - Jim Wagoner
Website: http://www.dcn.davis.ca.us/~bluesky
E-Mail: aqmd@butteair.dcsi.net
Phone: (530)891-2882
Fax: (530) 891-2878

CALAVERAS COUNTY APCD
(all of Calaveras County)
Government Center
891 Mountain Ranch Rd.
San Andreas, CA 95249-9709
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Deputy APCO - Lakhmir Grewal
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Fax: (209) 754-6521

COLUSA COUNTY APCD
(all of Colusa County)
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EL DORADO COUNTY APCD
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Program Mgr. - Dennis Otani
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FEATHER RIVER AQMD
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GLENN COUNTY APCD
(all of Glenn County)
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GREAT BASIN UNIFIED APCD
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Duane Ono
District Counsel - Brian Lamb
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Phone: (661)862-5250
Fax: (661) 862-5251

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Lakeport, CA 95453-5405
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Susanville, CA 96130-4215
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E portion of Riverside County)
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NORTHERN SIERRA AQMD
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Rules - Aleta Kennard
Phone: (916) 386-6179
Stationary Sources - Dave Grose
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Phone: (916) 386-6617
Permitting - Bruce Nixon
Phone: (916) 386-6623
Prog. Coord.- Brigette Tollstrup
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Strategic Planning - Karen Wilson
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Public Information - Kerry Shearer
Phone: (916) 386-6180
Mobile Sources - Tim Taylor
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Administration - Lashelle Dozier
Phone: (916) 386-7004
Websites: http://www.airquality.org or
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Phone: (619) 694-3313
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Phone: (619) 694-3300
Fax: (619) 694-2730

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Permitting and Business Assistance -
Seyed Sadredin
Compliance - Bob Kard
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Administrative Services - Roger McCoy
Public Information/Education - Josette Bello
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Toxics - Tom Roemer
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Administrative Services - John Nicholas
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Phone: (805) 961-8927
Major Source - Terry Dressler
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Public Information - Bobbie Bratz
Phone: (805) 961-8920
Clerk of the Board
Phone: (805) 568-2245
Business/Community Assistance -
Frances Gilliland
Phone: (805) 961-8868
Complaints
Phone: (805) 961-8800
Daily Air Quality Reports
Phone: (805) 961-8804
Newsletter Subscriptions
Phone: (805) 961-8867
Other Subscriptions (rules, notices)
Phone: (805) 961-8911
Website: http://www.sbcapcd.org
E-Mail: apcd@sbcapcd.org
Phone: (805) 961-8800
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Redding, CA 96001-1759
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Phone: (530) 225-5674
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SISKIYOU COUNTY APCD
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525 So. Foothill Dr.
Yreka, CA 96097-3036
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SOUTH COAST AQMD
(Los Angeles County except
for Antelope Valley APCD, Orange County,
W portion of San Bernardino and
W portion of Riverside counties)
21865 E. Copley Dr.
Diamond Bar, CA 91765-4182
Note: All AQMD phone numbers begin with (909) 396 -
Executive Officer - Dr. Barry Wallerstein - 2100
Engineering & Compliance - Carol Coy - 2434
Planning, Rule Dev. & Area Sources - Jack Broadbent - 3789
Public Affairs & Transportation Programs - Lupe Valdez - 3780
Science & Technology Advancement - Dr. Chung S. Liu - 2103
Public Advisor - La Ronda Bowen - 3235
Business Assistance - Larry Kolczak - 3215
Communications - Tom Eichhorn - 3240
Finance - Rick Pearce - 2828
General Counsel - Peter Greenwald - 2303
Information Management - Chris Marlia - 3148
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TEHAMA COUNTY APCD
(all of Tehama County)
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Red Bluff, CA 96080-0038
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E-Mail: tehapcd@snowcrest.net
Phone: (530) 527-3717
Fax: (530) 527-0959

TUOLUMNE COUNTY APCD
(all of Tuolumne County)
22365 Airport
Columbia, CA 95310
Send mail to: 2 South Green Street
Sonora, CA 95370-4618
APCO - Gerald A. Benincasa
Deputy APCO and Business Assistance - Mike Waugh
Phone: (209) 533-5693
Fax: (209) 533-5520

VENTURA COUNTY APCD
(all of Ventura County)
669 County Square Dr., 2nd Fl.
Ventura, CA 93003-5417
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APPENDIX B

SUMMARY OF CURRENT DISTRICT RULES & VOC LIMITS

Summary of California Architectural Coating Rules

Volatile Organic Compound (VOC) Limits (grams per liter)

NOTE: This summary is provided for comparison purposes ONLY and should not be used as a replacement for existing rules.

No attempt was made to merge similar categories among different rules.

Coating	EPA	CARB	Antelope	Bay Area	Butte	Colusa	El Dorado	Feather River	Imperial	Kern	Mojave	Monterey	Placer	Sacramento	San Diego	San Joaquin	Santa Barbara	South Coast	Ventura
Rule Name or Number	63 FR 176: 48848	SCM	1113	8-3	240	2.26	215	3.15	424	410.1	1113	426	218	442	67	4601	323	1113	74.2
Acrylic Polymers (Industrial Maintenance)			420	420															
Alkyds (Industrial Maintenance)			420	420															
Antenna	530												TBD						
Anti-Fouling	450												TBD						
Anti-Graffiti (Industrial Maintenance)	600	340					340		340	420	600		340	340	600	340	340		340
Bituminous and Mastics	500												TBD						
Bituminous Coating Materials (Industrial Maintenance)			420	420															
Bituminous Roof Coatings																		300 [250 7/1/2002]	
Bond Breakers	600	350	350	E	E	E	350	E	350	350	350	E	350	350	350	350	350	350	350
Calcimine Recoaters	475																		
Catalyzed Epoxy (Industrial Maintenance)			420	420															
Chalkboard Resurfacers	450												350						
Chemical Storage Tank Coatings																		420 [100 7/1/2006]	
Chlorinated Rubber (Industrial Maintenance)			420	420															
Concrete Curing Compounds	350	350	350	350	800	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Concrete Curing and Sealing Compounds	700																		
Concrete Protective	400												TBD						
Concrete Surface Retarders	780																		
Conversion Varnishes	725																		
Dry Fog	400	400	400	E	E	E	400	E	400	400	400	E	400	400	400	400	400	400	400
Enamel Undercoaters				350	550	350		350		350		350				350			
Essential Public Service Coatings																		420 [340 7/1/2002] [100 7/1/2006]	
Extreme High Durability	800												TBD						
Faux Finishing/Glazing (Japans)	700		350															350	
Fire Proofing, Exterior			350															350	
Fire Retardant, Clear		650	650	E	E	E	650	E	650	650	650			650	650	650	650	650	650
Fire Retardant, Pigmented		350	350	E	E	E	350	E	350	350	350			350	350	350	350	350	350
Fire Retardant/Resistive, Clear	850											E	650						
Fire Retardant/Resistive, Opaque	450											E	350						

Coating	EPA	CARB	Antelope	Bay Area	Butte	Colusa	El Dorado	Feather River	Imperial	Kern	Mojave	Monterey	Placer	Sacramento	San Diego	San Joaquin	Santa Barbara	South Coast	Ventura
Rule Name or Number	63 FR 176: 48848	SCM	1113	8-3	240	2.26	215	3.15	424	410.1	1113	426	218	442	67	4601	323	1113	74.2
Flats, Exterior	250	(250)	250 [100 7/1/2001] [50 7/1/2008]	(250)	250	(250)	(250)	(250)	(250)	(250)	(250)	(250)	250	(250)	(250)	(250)	(250)	250 [100 7/1/2001] [50 7/1/2008]	(250)
Flats, Interior	250	(250)	250 [100 7/1/2001] [50 7/1/2008]	(250)	250	(250)	(250)	(250)	(250)	(250)	(250)	(250)	250	(250)	(250)	(250)	(250)	250 [100 7/1/2001] [50 7/1/2008]	(250)
Flats, Specialty				400	650	400	400	400		400		400		400		400	250		
Floor	400												TBD					420 [100 7/1/2002] [50 7/1/2006]	
Flow	650												TBD						
Form Release Compounds	450	250					250		250	250			250	250	250	250	250		250
Graphic Arts (Sign Paints)	500	500	500	E	E	E	500	E	500	500	500	E	500	500	500	500	500	500	500
Heat Reactive	420												TBD						
High Temperature	650												420						
High Temperature (Industrial Maintenance)		420					420		420	420	550			420	650	420	420	[550 7/1/2002] [420 7/1/2006]	420
Impacted Immersion	780												TBD						
Industrial Maintenance	450	340							340	420	420		420	340	420	340	340	420 [250 7/1/2002] [100 7/1/2006]	
Industrial Maintenance Primers and Topcoats					800	420	420	420				420							420
Inorganic Polymers (Industrial Maintenance)			420	420															
Lacquers, Clear		680	550 [275 1/1/2005]	680	800	680	680	680	680	680	680	680		680	680	680	350	550 [275 1/1/2005]	680
Lacquers (Including Lacquer Sanding Sealers)	680												680						
Lacquers, Pigmented			550 [275 1/1/2005]				680											550 [275 1/1/2005]	680
Low Solids Coatings			120	120												120		120	
Low Solids Stains	120						120						120						
Low Solids Wood Preservatives	120						120						120						
Magnesite Cement	600	450	450				450		450	450	600		450	450	600	450	450	450	450
Mastic Texture	300	300	300	E	E	E	300	E	300	300	300	E	300	300	300	300	300	300	300
Metallic Pigmented	500	500	500	E	E	E	500	E	500	500	500	E	500	500	500	500	500	500	500
Multi-Color	580	420	250	E	E	E	420	E	420	420	580	E	420	420	580		420	250	420
Nonferrous Ornamental Metal Lacquers and Surface Protectants	870												TBD						

Coating	EPA	CARB	Antelope	Bay Area	Butte	Colusa	El Dorado	Feather River	Imperial	Kern	Mojave	Monterey	Placer	Sacramento	San Diego	San Joaquin	Santa Barbara	South Coast	Ventura
Rule Name or Number	63 FR 176: 48848	SCM	1113	8-3	240	2.26	215	3.15	424	410.1	1113	426	218	442	67	4601	323	1113	74.2
Non Flats, Interior	380	250	250	250	380	250	(250)	(250)	(250)	(250)	(250)	(250)	250	(250)	(250)	(250)	(250)	250 [150 7/1/2002] [50 7/1/2006]	(250)
Non Flats, Exterior	380	250	250	250	380	250	(250)	(250)	(250)	(250)	(250)	(250)	250	(250)	(250)	(250)	(250)	250 [150 7/1/2002] [50 7/1/2006]	(250)
Nuclear	450												TBD						
Pre-Treatment Wash Primers	780	420	780				675		420	420	780		675	420	780	420	420	780	420
Primers and Undercoaters	350												350						
Primers, Sealers, and Undercoaters, General		350	350	350	550	350	350	350	350	350	350	350		350	350	350	350	350 [200 7/1/2002] [100 7/1/2006]	350
Primers, Sealers, and Undercoaters, Specialty				350	550	350	350	350				350							
Quick Dry Enamels	450		400	400	650	400	400	400		400	400	400	400	400	400	400	250	400 [250 7/1/2002] [50 7/1/2006]	400
Quick Dry Primers and Sealers				E						450				450		450			
Quick Dry Primers, Sealers, and Undercoaters	450				E	E		E			450	E	350		525		350	350* [200 7/1/2002] [100 7/1/2006]	E
Recycled Coatings																		250 [100 7/1/2006]	
Repair and Maintenance Thermoplastic	650												650						
Roof	250	300	300	300	500	300	300	300	300	300	300	300	300	300	300	300	300	250	300
Rust Preventative	400												TBD					400 [100 7/1/2006]	
Sanding Sealers		350	350						350	350	550			350	550	350	350	350	
Sanding Sealers (Non-Lacquer)	550						350						350						350
Sealers (Including Clear Wood Sealers)	400												350						
Shellacs, Clear	730	730	730	E	E	E	730	E	730	730	730	E	730	730	730	730	730	730	730
Shellacs, Opaque	550			E	E	E		E				E	550						
Shellacs, Pigmented		550	550	E	E	E	550	E	550	550	550	E		550	550	550	550	550	550
Silicones (Industrial Maintenance)			420	420															
Specialty Primers																		350 [100 7/1/2006]	
Stains, Clear and Semitransparent	550		350										350					350 [250 7/1/2002]	
Stains, Semitransparent		350		350	700	350	350	350	350	350	350	350		350	350	350	350		350
Stains, Opaque	350	350	350	350	650	350	350	350	350	350	350	350	350	350	350	350	350	350 [250 7/1/2002]	350
Stain Controllers	720																		
Swimming Pool, General	600	340	340	E	E	E	340	E	340	340	650	E	340	340	650	340	340	340	340

Coating	EPA	CARB	Antelope	Bay Area	Butte	Colusa	El Dorado	Feather River	Imperial	Kern	Mojave	Monterey	Placer	Sacramento	San Diego	San Joaquin	Santa Barbara	South Coast	Ventura
Rule Name or Number	63 FR 176: 48848	SCM	1113	8-3	240	2.26	215	3.15	424	410.1	1113	426	218	442	67	4601	323	1113	74.2
Swimming Pool Repair & Maintenance		340	650				650		340	600	650			340	650	340	340	650	340
Thermoplastic Rubber and Mastics	550												TBD						
Tile-Like Glaze				E	E	E		E				E							
Traffic	150		150				250				250		250		250			150	250
Traffic, Applied to Other Surfaces		250		250	250	250		250	250	250	250	250		250		250	250		
Traffic, Applied to Public Streets and Highways		250		250	650	250		250	250	250		250		250		250	250		
Traffic, Black Traffic Coatings		250		250	650	250		250	250	250	650	250		250		250	250		
Unique Vehicles (Industrial Maintenance)			420	420															
Urethane Polymers (Industrial Maintenance)			420	420															
Varnishes	450	350	350	350	650	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Vinyl Chloride Polymers (Industrial Maintenance)			420	420															
Waterproof Mastics				300	500	300		300		300		300			300	300			
Water Proofing Sealers		400	400	400	800	400	400	400	400	400	400	400		400	400	400	400		400
Waterproofing Sealers, Wood																		400 [250 7/1/2002]	
Waterproofing Sealers, Concrete/Masonry																		400	
Water Proofing Sealers and Treatments, Clear	600												400						
Water Proofing Sealers and Treatments, Opaque	600												400						
Wood Preservatives, Below Ground	550	350	350	E	E	E	350	E	350	350	600	E	350	350	600	350	350	350	350
Wood Preservatives, Clear and Semitransparent	550	350	350	350	700	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Wood Preservatives, Opaque	350	350	350	350	650	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Zone Marking	450																		
Adopted	Sep 98	May 89	Jul 97	Mar 78	July 79	1979	Sep 94	June 91	Nov 82	Apr 72	Feb 79	May 79	Jun 79	Dec 78	Nov 77	Apr 91	Oct 71	Sep 77	Jun 79
Last Amended				Nov 98	Apr 96	May 91	Sep 94	May 96	Jan 90	May 97	Nov 92	Dec 96	Aug 97	Sep 96	May 96	Sep 97	Jul 96	May 99	Aug 92

Coating	EPA	CARB	Antelope	Bay Area	Butte	Colusa	El Dorado	Feather River	Imperial	Kern	Mojave	Monterey	Placer	Sacramento	San Diego	San Joaquin	Santa Barbara	South Coast	Ventura
Rule Name or Number	63 FR 176: 48848	SCM	1113	8-3	240	2.26	215	3.15	424	410.1	1113	426	218	442	67	4601	323	1113	74.2
Notes:																			
*The specified limit applies unless the manufacturer submits a report pursuant to Rule 1113 (g)(2).																			
Yolo-Solano Rule 2.14, Architectural Coatings, was adopted by the ARB on July 26, 1979 (ARB Resolution 79-63). Some provisions of the rule are outdated.																			
E means that the district rule specifically exempts this category from VOC limits.																			
TBD means the VOC limit will be assigned at a later date, pending adoption of the EPA national rule.																			
District rules (except for Butte) and the ARB SCM state that a coating's VOC limit is 250 grams per liter, with the exception of categories listed in the above table.																			
Parentheses indicate VOC limits that apply due to the 250 grams per liter default provision, but the limits are not specifically stated in the rule.																			
Brackets indicate future effective VOC limits.																			
The EPA rule states that if a coating is not defined in the table above, it falls into the flat or nonflat category based on the gloss level, and the applicable limit applies.																			
s:\cpbjob\coatings\usepa\summary.xls (revised 6/10/99)																			

APPENDIX C

SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Draft 6/10/99

xxx 1999

California Air Resources Board (ARB)
Suggested Control Measure for Architectural Coatings

RULE _____ ARCHITECTURAL COATINGS

1. APPLICABILITY

1.1 Except as provided in subsection 1.2, the provisions of this rule are 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.

1.2 The provisions of this rule do not apply to any architectural coating described in subsections 1.2.1 through 1.2.3:

1.2.1 A coating that is manufactured for use outside of the District or for shipment to other manufacturers for repackaging.

1.2.2 A coating that is an aerosol product.

1.2.3 A coating that is sold in a container with a volume of one liter or less.

2. DEFINITIONS

2.0 Adhesive: Any chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means.

2.1 Aerosol Product: A pressurized spray system that dispenses product ingredients by means of a propellant or mechanically induced force. “Aerosol Product” does not include pump sprays.

2.2 Appurtenance: Any accessory to a stationary structure coated at the site of installation, whether installed or detached, including but not limited to: bathroom and kitchen fixtures; cabinets; concrete forms; doors; elevators; fences; hand railings; heating equipment, air conditioning equipment, and other fixed mechanical equipment or stationary tools; lampposts; partitions; pipes and piping systems; rain gutters and downspouts; stairways, fixed ladders, catwalks, and fire escapes; and window screens.

2.3 Architectural Coating: A coating recommended for application to stationary structures and their appurtenances at the site of installation, to portable buildings at the site of installation, to pavements, or to curbs. Coatings applied in shop applications or to non-stationary structures such as airplanes, ships, boats, railcars, and automobiles, and adhesives are not considered architectural coatings for the purposes of this rule.

2.4 Bituminous Coating: A coating formulated and recommended for roofing, pavement sealing, or waterproofing that incorporates bitumens. Bitumens are black or brown materials including, but not limited to, asphalt, tar, pitch, and asphaltite that are soluble in carbon disulfide, consist mainly of hydrocarbons, and are obtained from natural deposits or as residues from the distillation of crude petroleum or coal.

2.5 Bond Breaker: A coating formulated and recommended for application between layers of concrete to prevent a freshly poured top layer of concrete from bonding to the layer over which it is poured.

2.6 Clear Wood Coatings: Clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a transparent or translucent solid film.

2.7 Coating: A material applied onto or impregnated into a substrate for protective, decorative, or functional purposes. Such materials include, but are not limited to, paints, varnishes, sealers, and stains.

2.8 Colorant: A concentrated pigment dispersion in water, solvent, and/or binder that is added to an architectural coating in a paint store or at the site of application to produce the desired color.

2.9 Concrete Curing Compound: A coating formulated and recommended for application to freshly poured concrete to retard the evaporation of water.

2.10 Dry Fog Coating: A coating formulated and recommended only for spray application such that overspray droplets dry before subsequent contact with incidental surfaces in the vicinity of the surface coating activity.

2.11 Exempt Solvent: A compound identified as exempt under the definition of Volatile Organic Compounds (VOC), subsection 2.43.

2.12 Fire-Retardant Coating: A coating formulated and recommended to have a flame spread index of less than 25 when tested in accordance with American Society for Testing and Materials (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 (incorporated by reference--see section 5).

2.13 Flat Coating: A coating that is not defined under any other definition in this rule and that registers gloss less than 15 on an 85-degree meter or less than 5 on a 60-degree meter according to ASTM Designation D 523-89, Standard Test Method for Specular Gloss (incorporated by reference--see section 5.).

2.14 Floor Coating: An opaque coating that is formulated and recommended for application to flooring including, but not limited to, decks, porches, and steps, for the purposes of abrasion resistance.

2.15 Form-Release Compound: A coating formulated and recommended for application 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.

2.16 Graphic Arts Coating or Sign Paint: A coating formulated and recommended for hand-application 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.

2.17 High-Temperature Coating: A high performance coating formulated, recommended, and used for application to substrates exposed continuously or intermittently to temperatures above 204°C (400°F).

2.18 Industrial Maintenance Coating: A high performance architectural coating, including primers, sealers, undercoaters, intermediate coats, and topcoats, formulated and recommended for application to substrates exposed to one or more of the following extreme environmental conditions listed in subsections 2.18.1 through 2.18.5 in an industrial, commercial, or institutional setting :

2.18.1 Immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;
2.18.2 Acute or chronic exposure to corrosive, caustic or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;
2.18.3 Repeated exposure to temperatures above 121°C (250°F);
2.18.4 Repeated (frequent) heavy abrasion, including mechanical wear and repeated (frequent) scrubbing with industrial solvents, cleansers, or scouring agents; or
2.18.5 Exterior exposure of metal structures and structural components.

2.19 Lacquer: A clear or opaque wood coating, including clear lacquer sanding sealers, formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and to provide a solid, protective film. Lacquer stains are considered stains, not lacquers.

2.20 Low Solids Coating: A coating containing 0.12 kilogram or less of solids per liter (1 pound or less of solids per gallon) of coating material and for which at least half of the volatile component is water.

2.21 Magnesite Cement Coating: A coating formulated and recommended for application to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

2.22 Mastic Texture Coating: A coating formulated and recommended to cover holes and minor cracks and to conceal surface irregularities, and is applied in a single coat of at least 10 mils (0.010 inch) dry film thickness.

2.23 Metallic Pigmented Coating: A coating containing at least 48 grams of elemental metallic pigment per liter of coating as applied (0.4 pounds per gallon), excluding zinc.

2.24 Multi-Color Coating: A coating that is packaged in a single container and exhibits more than one color when applied.

2.25 Nonflat Coating: A coating that is not defined under any other definition in this rule and that registers a gloss of 15 or greater on an 85-degree meter or 5 or greater on a 60-degree meter according to ASTM Designation D 523-89, Standard Test Method for Specular Gloss (incorporated by reference--see section 5.).

2.26 Pre-treatment Wash Primer: A primer that contains a minimum of 0.5 percent acid, by weight, that is formulated and recommended for application directly to bare metal surfaces to provide corrosion resistance and to promote adhesion of subsequent topcoats.

2.27 Primer: A coating formulated and recommended for application to a substrate to provide a firm bond between the substrate and subsequent coats.

2.28 Quick-Dry Enamel: A nonflat coating that has the following characteristics:
  2.28.1 Is capable of being applied directly from the container under normal conditions with ambient temperatures between 16 and 27°C (60 and 80°F);
  2.28.2 When tested in accordance with ASTM Designation D 1640-83 (Reapproved 1989), Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature (incorporated by reference--see section 5.), sets to touch in 2 hours or less, is tack free in 4 hours or less, and dries hard in 8 hours or less by the mechanical test method; and
  2.28.3 Has a dried film gloss of 70 or above on a 60 degree meter.

2.29 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.

2.30 Roof Coating: A coating formulated and recommended 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.

2.31 Rust Preventative Coating: A coating formulated and recommended for use in preventing the corrosion of ferrous metal surfaces in residential situations.

2.32 Sanding Sealer: A clear wood coating formulated and recommended for application to bare wood to seal the wood and to provide a coat that can be sanded to create a smooth surface. A sanding sealer that also meets the definition of a lacquer is not included in this category, but is included in the lacquer category.

2.33 Sealer: A coating formulated and recommended for application to a substrate for one or more of the following purposes: to prevent subsequent coatings from being absorbed by the substrate; to prevent harm to subsequent coatings by materials in the substrate; to block stains, odors, or efflorescence; to seal fire, smoke, or water damage; or to condition chalky surfaces.

2.34 Shellac: A clear or opaque coating formulated with natural resins (except nitrocellulose resins) soluble in alcohol (including, but not limited to, the resinous secretions of the lac beetle, Laciffer lacca). Shellacs dry by evaporation without chemical reaction and provide a quick-drying, solid protective film that may be used for blocking stains.

2.35 Solicit: To require for use or to specify, by written or oral contract.

2.36 Shop Application: A coating is applied to a product or a component of a product in a factory or shop as part of a manufacturing, production, or repairing process (e.g., original equipment manufacturing coatings).

2.37 Stain: A coating formulated to change the color of a surface but not conceal the surface. This includes lacquer stains.

2.38 Swimming Pool Coating: A coating formulated and recommended to coat the interior of swimming pools and to resist swimming pool chemicals.

2.39 Tint Base: A coating to which colorant is added in a paint store or at the site of application to produce a desired color.

2.40 Traffic Marking Coating: A coating formulated and recommended for marking and striping streets, highways, or other traffic surfaces including, but not limited to, curbs, berms, driveways, parking lots, sidewalks, and airport runways.

2.41 Undercoater: A coating formulated and recommended to provide a smooth surface for subsequent coatings.

2.42 Varnish: A clear or semi-transparent coating, excluding lacquers and shellacs, formulated and recommended to provide a durable, solid, protective film. Varnishes may contain small amounts of pigment to color a surface, or to control the final sheen or gloss of the finish.

2.43 Volatile Organic Compound (VOC): Any compound of carbon, which may be emitted to the atmosphere during the application of and or subsequent drying or curing of coatings subject to this rule, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, and excluding the following:

2.43.1 methane;
methylene chloride (dichloromethane);
1,1,1-trichloroethane (methyl chloroform);
trichlorofluoromethane (CFC-11);
dichlorodifluoromethane (CFC-12);
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113);
1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114);
chloropentafluoroethane (CFC-115);
chlorodifluoromethane (HCFC-22);
1,1,1-trifluoro-2,2-dichloroethane (HCFC-123);
2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124);
1,1-dichloro-1-fluoroethane (HCFC-141b);
1-chloro-1,1-difluoroethane (HCFC-142b);
trifluoromethane (HFC-23);
pentafluoroethane (HFC-125);
1,1,2,2-tetrafluoroethane (HFC-134);
1,1,1,2-tetrafluoroethane (HFC-134a);
1,1,1-trifluoroethane (HFC-143a);
1,1-difluoroethane (HFC-152a);
cyclic, branched, or linear completely methylated siloxanes;
the following classes of perfluorocarbons:
    (A) cyclic, branched, or linear, completely fluorinated alkanes;
    (B) cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;
    (C) cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and
    (D) sulfur-containing perfluorocarbons with no unsaturations and with the sulfur bonds only to carbon and fluorine; and

2.43.2 the following low-reactive organic componds which have been exempted by the U.S. EPA:
    acetone;
    ethane; and
    parachlorobenzotrifluoride (1-chloro-4-trifluoromethyl benzene).

2.44 VOC Content: The weight of VOC per volume of coating, calculated according to the procedures in subsection 5.1.

2.45 Waterproofing Wood Sealer: A coating formulated and recommended for application to a wood substrate for the primary purpose of preventing the penetration of water.

2.46 Waterproofing Concrete/Masonry Sealer: A clear or pigmented coating that is formulated for sealing concrete and masonry to provide resistance against water, alkalis, acids, ultraviolet light, and staining.

2.47 Wood Preservative: A coating formulated and recommended to protect wood from decay or insect attack, and which contains a wood preservative chemical that is registered with the United States Environmental Protection Agency (U.S. EPA) under the Federal Insecticide, Fungicide, and Rodenticide Act (7 United States Code (U.S.C.) Section 136, *et seq.*) and that is registered with the California Department of Pesticide Regulation.

3. STANDARDS

3.1 **VOC Content Limits:** Except as provided in subsections 3.2 and 3.3, no person shall, within the District, supply, offer for sale, sell, apply, or solicit the application of any architectural coating listed in Table 1 which contains VOC (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.

3.2 **Most Restrictive VOC Limit:** If anywhere on the container of any architectural coating, or any label or sticker affixed to the container, or in any sales, advertising, or technical literature supplied by a manufacturer or anyone acting on their behalf, any representation is made that indicates that the coating meets the definition of or is recommended for use for more than one of the coating categories listed in Table 1, then the most restrictive VOC content limit shall apply. This provision does not apply to subsections 3.2.1 through 3.2.6:

3.2.1 Lacquer sanding sealers are subject only to the VOC content limit in Table 1 for lacquers.

3.2.2 Metallic pigmented coatings that meet the definition of or are recommended for use as roof coatings, industrial maintenance coatings, or primers are subject only to the VOC content limit in Table 1 for metallic pigmented coatings.

3.2.3 Shellacs that meet the definition of or are recommended for use as any other architectural coating are subject only to the VOC content limit in Table 1 for shellacs.

3.2.4 Pre-treatment wash primers that meet the definition of or are recommended for use as primers or that meet the definition for industrial maintenance coatings are subject only to the VOC content limit in Table 1 for pre-treatment wash primers.

3.2.5 Industrial maintenance coatings that meet the definition of or are recommended for use as primers, sealers, undercoaters, or mastic texture coatings are subject only to the VOC content limit in Table 1 for industrial maintenance coatings.

3.2.6 High temperature coatings that meet the definition of or are recommended for use as industrial maintenance coatings are subject only to the VOC content limit in Table 1 for high temperature coatings.

3.3 **Sell-Through Provision:** Sale of a coating manufactured prior to the effective date of the corresponding standard in Table 1, and not complying with that standard, shall not constitute a violation of subsection 3.1 until three years after the effective date of the standard, nor shall application of such a coating.

3.4 **Painting Practices:** All architectural coating containers used to apply the contents therein to a surface direct from said container by pouring, siphoning, brushing, rolling, padding, ragging or other means, shall be closed when not in use. These architectural coating containers include, but should not be limited to, drums, buckets, cans, pails, trays or other application containers. Containers of VOC-containing materials for thinning and cleanup shall also be closed when not in use. “Not in use” includes, but is not limited to, interruption, delay, completion of transfer of said contents, or termination of said application.

3.5 **Thinning:** Any person who applies or solicits the application of any architectural coating within the District shall follow the manufacturer’s recommendation regarding thinning of the coating under normal environmental and application conditions as described in subsection 4.1.2. This recommendation shall not apply to the thinning of architectural coatings with water. No person who applies or solicits the application of any architectural coating shall apply a coating that is thinned to exceed the applicable VOC limit in Table 1.

3.6 **Industrial Maintenance Coatings:** Any person who applies or solicits the application of any architectural coating within the District shall follow the manufacturer’s recommendation regarding industrial maintenance coatings as described in subsection 4.1.5. No person who applies or solicits the application of any architectural coating shall apply an industrial maintenance coating in or on a residence as defined in subsection 2.29 or in or on areas of industrial, commercial, or institutional facilities not exposed to the extreme environmental conditions identified in subsection 2.18, such as office space and meeting rooms.

3.7 **Coatings Not Listed in Table 1:** For any coating that cannot be classified as a category listed in Table 1, the VOC limit shall be determined by classifying the coating as a flat coating or a nonflat coating, based on its gloss, as defined in subsections 2.13 and 2.25, and the corresponding flat or nonflat VOC limit shall apply.

4. CONTAINER LABELING REQUIREMENTS

4.1 Each manufacturer of any architectural coating subject to the provisions of this subsection shall provide the information listed in subsections 4.1.1 through 4.1.5 on the coating container in which the coating is sold or distributed.

4.1.1 **Date Code:** The date the coating was manufactured, or a date code representing the date shall be indicated on the label, lid, or bottom of the container. Each manufacturer of such coatings shall file with the Air Pollution Control Officer and the Executive Officer of the California Air Resources Board (ARB), an explanation of each code.

4.1.2 **Thinning Recommendations:** A statement of the manufacturer's recommendation regarding thinning of the coating shall be indicated on the label or lid of the container. This requirement does not apply to the thinning of architectural coatings with water. If thinning of the coating prior to use is not necessary, the recommendation must specify that the coating is to be applied without thinning.

4.1.3 **VOC Content:** Each container of any coating subject to this rule 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 in grams of VOC per liter of coating (less water and exempt solvent, and excluding any colorant added to tint bases). VOC content displayed shall be calculated using product formulation data, or shall be determined using the test methods in subsection 5.2. The equations in subsection 5.1 shall be used to calculate VOC content.

4.1.4 **Coating Category Designation:** Each container of any coating subject to this rule shall display on the label or lid of the container the applicable coating category with which the coating is required to comply, as listed in Table 1. Alternatively, this information shall be displayed on a product data sheet for the coating.

4.1.5 **Industrial Maintenance Coatings:** In addition to the information specified in subsection 4.1, each manufacturer of any industrial maintenance coating subject to the provisions of this subsection shall display on the label or lid of the container in which the coating is sold or distributed one or more of the descriptions listed in subsections 4.1.5.1 through 4.1.5.4.

4.1.5.1 "For industrial use only."

4.1.5.2 "For professional use only."

4.1.5.3 "Not for residential use" or "Not intended for residential use."

4.1.5.4 "This coating is intended for use under the following condition(s):" (Include each condition in subsections 4.1.5.4.1 through 4.1.5.4.5 that applies to the coating.)

4.1.5.4.1 Immersion in water, wastewater, or chemical solutions (aqueous and nonaqueous solutions), or chronic exposure of interior surfaces to moisture condensation;

4.1.5.4.2 Acute or chronic exposure to corrosive, caustic, or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;

4.1.5.4.3 Repeated exposure to temperatures above 121°C (250°F);

4.1.5.4.4 Repeated (frequent) heavy abrasion, including mechanical wear and repeated (frequent) scrubbing with industrial solvents, cleaners, or scouring agents; or

4.1.5.4.5 Exterior exposure of metal structures and structural components.

5. COMPLIANCE PROVISIONS AND TEST METHODS

5.1 **Calculation of VOC Content:** For the purpose of determining compliance with the VOC content limits in Table 1, the VOC content of a coating shall be determined by using the procedures described in subsection 5.1.1 or 5.1.2, as appropriate. The VOC content of a tint base shall be determined without colorant that is added after the tint base is manufactured.

5.1.1 With the exception of low solids coatings, determine the VOC content in grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, excluding the volume of any water and exempt compounds. Calculate the VOC content using equation 1 as follows:

$$\text{VOC Content} = \frac{(W_s - W_w - W_{ec})}{(V_m - V_w - V_{ec})} \qquad \textbf{(1)}$$

Where:

VOC content = grams of VOC per liter of coating

W_s = weight of volatiles, in grams

W_w = weight of water, in grams

W_{ec} = weight of exempt compounds, in grams

V_m = volume of coating, in liters

V_w = volume of water, in liters

V_{ec} = volume of exempt compounds, in liters

5.1.2 For low solids coatings, determine the VOC content in units of grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, including the volume of any water and exempt compounds. Calculate the VOC content using equation 2 as follows:

$$\text{VOC Content}_{ls} = \frac{(W_s - W_w - W_{ec})}{(V_m)} \qquad \textbf{(2)}$$

Where:

VOC content_{ls} = the VOC content of a low solids coating in grams of VOC per liter of coating

W_s = weight of volatiles, in grams

W_w = weight of water, in grams

W_{ec} = weight of exempt compounds, in grams
V_m = volume of coating, in liters

5.2 **VOC Content of Coatings:** To determine the composition of a coating in order to perform the calculations in subsection 5.1, the reference method for VOC content is Method 24 of appendix A of 40 Code of Federal Regulations (CFR) part 60, Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, except as provided in subsections 5.3, 5.4, and 5.5. An alternative method to determine the VOC content of coatings is South Coast Air Quality Management District (SCAQMD) Method 304, incorporated by reference in subsection 5.5.10. The exempt compounds content shall be determined by SCAQMD Method 303, incorporated by reference in subsection 5.5.9. To determine the VOC content of a coating, the manufacturer may use Method 24 of Appendix A of 40 CFR part 60, or an alternative method as provided in subsection 5.3, formulation data, or any other reasonable means for predicting that the coating has been formulated as intended (e.g., quality assurance checks, recordkeeping). However, if there are any inconsistencies between the results of a Method 24 test and any other means for determining VOC content, the Method 24 test results will govern, except when an alternative method is approved by the ARB and the U.S. EPA as an alternative to Method 24. The District Air Pollution Control Officer (APCO) may require the manufacturer to conduct a Method 24 analysis.

5.3 **Alternative Test Methods:** Other test methods demonstrated to provide results that are acceptable for purposes of determining compliance with subsection 5.2, after review by the staffs of the District, the ARB, and the U.S. EPA, and approved in writing by the District APCO, may also be used.

5.4 **Methacrylate Traffic Marking Coatings:** Analysis of methacrylate multicomponent coatings used as traffic marking coatings shall be conducted according to the procedures specified in 40 CFR part 59, subpart D, appendix A, Determination of Volatile Matter Content of Methacrylate Multicomponent Coatings Used as Traffic Marking Coatings. This method is a modification of Method 24 of appendix A of 40 CFR part 60, and it has not been approved for methacrylate multicomponent coatings used for other purposes than as traffic marking coatings or for other classes of multicomponent coatings.

5.5 **Methods Incorporated by Reference:** The materials listed in this subsection are incorporated by reference in the subsections noted.

5.5.1 **Flame Spread Index:** American Society for Testing and Materials (ASTM) Designation E 84-91A, Standard Test Method for Surface Burning Characteristics of Building Material, incorporation by reference approved for section 2., Fire Retardant Coating.

5.5.2 **Gloss Determination:** ASTM Designation D 523-89, Standard Test Method for Specular Gloss, incorporation by reference approved for section 2., Flat Coating, Nonflat Coating, and Quick-Dry Enamel.

5.5.3 **Low Solids Coatings:** Bay Area Air Quality Management District (BAAQMD) Method 31, Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners, and Low Solids Coatings, BAAQMD Manual of Procedures, Volume III, amended 4/15/92, incorporation by reference approved for section 2., Low Solids Coating.

5.5.4 **Metal Content of Coatings:** SCAQMD Method 311-91, Determination of Percent Metal in Metallic Coatings by Spectrographic Method, incorporation by reference approved for section 2., Metallic Pigmented Coating.

5.5.5 **Acid Content of Coatings:** ASTM Designation D 1613-85, Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products, incorporation by reference approved for section 2., Pre-treatment Wash Primer.

5.5.6 **Drying Times:** ASTM Designation D 1640-83 (Reapproved 1989), Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature, incorporation by reference approved for section 2., Quick-Dry Enamel.

5.5.7 **Exempt Compounds--Siloxanes:** BAAQMD Method 43, Determination of Volatile Methylsiloxanes in Solvent-Based Coatings, Inks, and Related Materials, BAAQMD Manual of Procedures, Volume III, adopted 11/6/96, incorporation by reference approved for section 2., Volatile Organic Compound.

5.5.8 **Exempt Compounds--Parachlorobenzotrifluoride (PCBTF)**: BAAQMD Method 41, Determination of Volatile Organic Compounds in Solvent Based Coatings and Related Materials Containing Parachlorobenzotrifluoride, BAAQMD Manual of Procedures, Volume III, adopted 12/20/95, incorporation by reference approved for section 2., Volatile Organic Compound.

5.5.9 **Exempt Compounds:** SCAQMD Method 303-91, Determination of Exempt Compounds, SCAQMD “Laboratory Methods of Analysis for Enforcement Samples,” incorporation by reference approved for section 2., Volatile Organic Compound and subsection 5.2.

5.5.10 **Alternative VOC Content of Coatings:** SCAQMD Method 304-91, Determination of Volatile Organic Compounds (VOC) in Various Materials, SCAQMD “Laboratory Methods of Analysis for Enforcement Samples,” incorporation by reference approved for subsection 5.2.

Table 1
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS

Limits are expressed in grams of VOC per liter[a] of coating as applied,
excluding the volume of any water, exempt compounds, or colorant added to tint bases.

Coating Category	**Effective Dates**					
	Current Limit	**7/1/2001**	**7/1/2002**	**1/1/2005**	**7/1/2006**	**7/1/2008**
Flat Coatings	250[b]	100[c]				50[c]
Nonflat Coatings	250[b]		150[c]		50[c]	
Specialty Coatings						
Bituminous Coatings	250[b]	50				
Bond Breakers	350					
Clear Wood Coatings • Lacquers (including lacquer sanding sealers) • Sanding Sealers (other than lacquer sanding sealers) • Varnishes	 680 350 350	 550		 275[c]		
Concrete Curing Compounds	350					
Dry Fog Coatings	400					
Fire-Retardant Coatings: • Clear • Pigmented	 650 350	250				
Floor Coatings	400[d]		100[c]		50[c]	
Form-Release Compounds	250					
Graphic Arts Coatings (Sign Paints)	500	150				
High Temperature Coatings	420					
Industrial Maintenance Coatings	340		250[c]		100[c]	
Low Solids Coatings	120[d]	120[e]				
Magnesite Cement Coatings	450					
Mastic Texture Coatings	300	250				
Metallic Pigmented Coatings	500					
Multi-Color Coatings	420	250				

Coating Category	**Effective Dates**					
	Current Limit	**7/1/2001**	**7/1/2002**	**1/1/2005**	**7/1/2006**	**7/1/2008**
Pre-treatment Wash Primers	420	250				
Primers, Sealers, and Undercoaters	350		200[c]		100[c]	
Quick-Dry Enamels	400[f]		250[c]		50[c]	
Roof Coatings	250[d]	50				
Rust Preventative Coatings	400[d]		250[c]		100[c]	
Shellacs:						
• Clear	730	650				
• Opaque	550					
Stains:						
• Clear and semi-transparent	350		250[c]			
• Opaque	350		150[c]			
Swimming Pool Coatings	340					
Traffic Marking Coatings	150[d]					
Waterproofing Sealers:	400					
• Concrete		400				
• Wood		400	250[c]			
Wood Preservatives	350					

[a] Conversion factor: one pound VOC per gallon (U.S.) = 119.82 grams VOC per liter.

[b] Current SCM default limit.

[c] These limits are subject to revision based on the outcome of scheduled SCAQMD technology assessments.

[d] National rule limit as of September 18, 1999.

[e] Units are grams of VOC per liter (pounds of VOC per gallon) of coating, including water and exempt compounds.

[f] Most common current district limit.

Compliance Advisory

Reference Table for Determining Analogous National Rule[a] and SCM [b] Categories

If your coating meets the National Rule[a] definition below...	**the following Suggested Control Measure[b] category and VOC limit applies.**
Antenna coatings Anti-fouling coatings Anti-graffiti coatings Chalkboard resurfacers Extreme high durability coatings Flow coatings Heat reactive coatings Impacted immersion coatings Nonferrous ornamental metal lacquers and surface protectants Nuclear coatings Repair and maintenance thermoplastic coatings Thermoplastic rubber coatings and mastics	Industrial maintenance coatings
Calcimine Recoaters	Flat or Nonflat coatings (depending on gloss)
Concrete curing and sealing compounds Concrete surface retarders	Concrete curing compounds
Concrete protective coatings	Waterproofing sealers
Conversion varnishes Faux finishing/glazing	Varnishes
Quick-dry primers, sealers, and undercoaters coatings Stain controllers Sealers (including interior clear wood sealers)	Primers, sealers, and undercoaters
Low solids stains Low solids wood preservatives	Low solids coatings
Zone marking coatings	Traffic marking coatings

[a] *National Volatile Organic Compound Emission Standards for Architectural Coatings* (40 CFR part 59, subpart D)
[b] 1999 *Air Resources Board Suggested Control Measure for Architectural Coatings*

APPENDIX C

COMMENTS ON THE NOTICE OF PREPARATION AND INITIAL STUDY AND RESPONSES TO COMMENTS

COMMENTS ON THE NOTICE OF PREPARATION AND INITIAL STUDY

Kessler & Associates, Inc.

July 12, 1999

Mr. Jim Nyarady
Manger, Strategy Evaluation Section
Stationary Source Division
California Air Resources Board
2020 L Street
PO Box 2815
Sacramento, California 95812

Dear Mr. Nyarady,

SUBJECT: COMMENTS ON NOTICE OF PREPARATION FOR CARB SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Kessler & Associates, Inc., a government affairs firm, represents the Dunn-Edwards Corporation (Dunn-Edwards) a Los Angeles, California-based manufacturer and seller of quality architectural coatings. This letter is in response to California Air Resources Board's (CARB's) Notice of Preparation (NOP) prepared for the proposed Suggested Control Measure (SCM) for Architectural Coatings.

Thank you for allowing us the opportunity to comment on the potential impacts of this proposed control measure.

INTRODUCTION

1-1 Regulation of paint impacts the environment in various ways, depending on the nature of the regulation. For example, reducing VOCs under certain conditions may actually contribute to ozone nonattainment because of the concept of negative reactivity.[1] CARB is currently examining promulgating a SCM for paint – a measure intended to have a positive impact on ozone non-attainment in California. The true impact on the environment of regulating the VOCs is currently the subject of debate and varied opinions. CARB's ultimate decision may very well dictate whether regulating VOCs will have a beneficial or detrimental impact on preventing ozone non-attainment in California.

1-2 To answer questions (not only on the state level, but the federal as well) regarding reactivity, Congress funded the construction of an air chamber to be built at the University of California at Riverside. Congress mandated that this chamber be utilized for the specific purpose of determining if and when the reduction of VOCs in paint is warranted. While Dunn-Edwards understands that drafting this SCM is currently

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[1] During 1998, representatives, officers and owners of the Dunn-Edwards Corporation communicated with CARB on issues relating to reactivity. Comments made by Dunn-Edwards during those meetings are incorporated by reference into this document.

1-2 underway, we believe that any VOC reduction should be postponed until the results of the chamber tests are known. This is warranted scientifically as well as from a policy position. With the "answer on the way," there is no need to have any potentially negative environmental (or economic) impact due to haste. If CARB determines that other reasons dictate the issuance of its SCM, Dunn-Edwards recommends that CARB incorporate the chamber's findings once they are published.

1-3 An SCM/state-wide approach might be counter-productive and/or inefficient because of: (a) differences in reactivity among areas, (b) differences in air quality problems among areas (i.e. stringent rules may not be required in same areas), (c) differences in uses/needs/exposure for architectural coatings, (d) different meteorological conditions, and, (e) the necessity to have stringent and extreme cost-ineffective rules.

SPECIFIC COMMENTS

INTRODUCTION

1-4 Page 1-1 states, "the proposed project is essentially a model rule intended to reduce volatile organic compound emissions from architectural coatings." This SCM does not recommend regulating VOC emissions, but rather regulating the VOC content of architectural coatings. All VOCs may not contribute equally, if at all, to ozone formation. The SCM needs to focus on VOC emissions. If reliance on test method 24 is the basis for VOC content, then Dunn-Edwards recommends changing/modifying this test method to more accurately reflect VOC emissions from the application of paint.

1-5 Various parts of this section deal with the SCM as well as the NOP being utilized as a model for individual air districts. Dunn-Edwards is concerned that such an approach does not adequately address the significant environmental/ecological/meteorological variations found within the state. Due to these variations, individual districts must alter CARB's EIR to such a degree that, in reality, air district resources may not, in the long run, be saved. Each district will still have to comply with CEQA to a level that reliance on the NOP/Program EIR may not provide any true assistance.

1-6 Page 1-2 to 1-3 state that CEQA "guidelines allow a lead agency to prepare a Program EIR for a series of actions that can be characterized as one large project <u>and</u> are related: (1) geographically, (2) as logical parts in a chain of contemplated actions, or (3) in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program." (Emphasis added.) The first part of this statement – that this Program EIR is one large project is, we believe, inaccurate. Throughout the NOP, CARB states that <u>individual</u> districts will have to decide the environmental impact of the rule. In addition, by its very nature, this SCM may or may not be adopted by specific districts. Furthermore, what rule each district adopts may differ significantly from the SCM. As such, this project is not one large project, but

1-6 rather a series of smaller ones each of which is within each district's jurisdiction to decide to use or not.

1-7 In addition, Dunn-Edwards believes that the SCM is not related geographically because, in addition to the statements above about each districts discretion, the state is made up of different airsheds, each with its own "needs" regarding reactivity as well as VOCs from paint emissions volume. Neither Section (2) nor Section (3) apply because this is not part of a chain of actions (again, the discretion of each district), nor is it a continuing program (CARB does not have direct authority to regulate VOCs from paint).

As such, Dunn-Edwards believes that a Program EIR may not be appropriate in this matter.

PROJECT DISCRIPTION

1-8 This section makes statements concerning uniformity. Dunn-Edwards is concerned that the regulations based on specific reactivity needs of the different airshed not be sacrificed to rules based on the policy decision that uniformity is required.

ALTERNATIVES

1-9 We strongly encourage the inclusion and consideration of the alternatives listed on page 1-9, particularly: performance-based standards, reactivity, product line averaging (based upon the VOC categories and levels mandated by South Coast Air Quality Management District, or examining the specific VOC categories and numbers found the federal architectural coating rule), and a seasonal approach. In addition, we urge CARB to consider an alternative based on the availability of specific VOCs emitted from paint to become available and part of an ozone nonattainment chemical reaction.

1-10 It is important that CARB understand that these alternatives, and specifically averaging, are necessary parts of a paint rule. Averaging must be required when lowering VOC content to allow consumers the ability to choose a durable high-quality coating that meets their needs without, based on CARB's current thinking, sacrificing air quality. Such alternatives allow manufacturers the flexibility to produce high-quality coatings that maintain desired performance characteristics.

1-11 We also urge CARB staff to consider including a provision wherein local districts perform a Technology Assessments similar to that found in South Coast Air Quality Management District's recently adopted changes to Rule 1113, to ensure that high quality durable coatings are available in the future.

REACTIVITY

1-12 The Draft EIR should evaluate the possibility that limiting solvent content in coating formulations may actually increase ground-level ozone formation (page 2-8). A reactivity-based regulatory scheme will provide CARB with the means to reach and maintain the ozone standard in a manner that is more cost-effective and equitable in its impact on the regulated community. A reactivity-based approach is consistent with the mandates of the Clean Air Act (Sections 183(e)) with its specific reactivity mandate

1-13 If the environmental assessment is to have a beneficial impact, it must consider reactivity. Otherwise, the rule may be detrimental to air quality. VOCs in paints need to be examined from a negative vs. positive reactivity posture. As part of the Reactivity Research Working Group and NARSTO, Dunn-Edwards has developed/obtained data that supports a reactivity-based VOC rule. Dunn-Edwards looks forward to sharing this technical data with CARB.

REGIONAL DEREGULATION

1-14 CARB should not start with the assumption of statewide regulation. Instead, regulations should be tailored to regional differences to optimize environmental benefits and minimize costs.

AIR QUALITY

1-15 Limiting VOC content may or may not reduce ozone. Whether limiting VOC content of architectural coatings actually reduces emissions, and whether reducing emissions actually reduces ozone formation, should be discussed in the air quality analysis to be contained in the EIR.

During the Rule 1113 rulemaking, SCAQMD District staff indicated that current Urban Airshed Models could not demonstrate measurable results from a source as small as CARB's estimate for the entire coatings category. Therefore, implementation of the SCM may not result in a measurable reduction in ozone formation.

1-16 The air quality analysis contained in this Program EIR should also consider the levels of ozone non-attainment in the 35 different California air districts. As indicated in Figure 1-2, the number of days the state ozone standard was exceeded as well as the peak ozone varies greatly by air district. This may be the result of numerous factors including differing meteorological conditions, types of industrial processes, reactivity of various VOC emissions, and ratio of VOCs:NOx in those areas. Such factors should be considered in determining whether or not a local architectural coatings rule based on SCM regulation results in measurable air quality benefits.

1-17 The initial study incorrectly states that there is no possibility that there will be a significant (negative) impact on air quality problems for criteria pollutants. This is inconsistent with CARB's decision to consider the "Seven Deadly Sins," set out on pp. 2-7 to 2-8.

Dunn-Edwards appreciates CARB's efforts in examining innovative and meaningful approaches to dealing with ozone nonattainment. We look forward to working with you on this and other important technological issues. These issues are the keys to the viability of our industry and our mutual goal of clean air.

Sincerely yours,

Howard Berman
Senior Vice President and
Environmental Counsel

The Sherwin-Williams Company
Environmental, Health & Regulatory Services
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115-1075
Facsimile: (216) 566-2730

FEDERAL EXPRESS NO. 809764184792
EARLY MORNING DELIVERY

July 21, 1999

Mr. Jim Nyarady
Manager, Strategy Evaluation Section
Stationary Source Division
2020 L. Street
P. O. Box 2815
Sacramento, CA 95812

Dear Mr. Nyarady,

The Sherwin-Williams Company is pleased to have this opportunity to comment on the Notice of Preparation (NOP) of a Draft Program Environmental Impact Report (EIR) and on the Initial Study for the Draft Program Environmental Impact Report (EIR) for the Suggested Control Measure for Architectural Coatings. The Sherwin-Williams Company is one of the largest coating manufacturers in the world, with 1998 annual sales close to five billion dollars. We maintain manufacturing facilities throughout the country, including several within the State of California. We maintain company-owned and operated Stores throughout the country. These are the exclusive distributors / retailers for the Sherwin-Williams brand. In addition to this distribution, our products, under a variety of additional brand names, are distributed through mass merchandisers, do-it-yourself outlets, hardware stores, and by independent distributors. Our product lines include some of the best known brands, including – but not limited to – Minwax®, Thompsons®, Pratt & Lambert®, Martin-Senour®, Dutch Boy®, Rust Tough®, Cuprinol®, Ralph Lauren®, and H&C®. In the architectural and industrial maintenance product areas these coatings are used for their decorative and protective properties.

2-1 We believe that it is premature to develop the NOP, the Draft Program EIR, and the Final EIR before the SCM rule is finalized, or – at least – closer to finalization. This is especially important since the expectation is for the EIR to be used by Districts wanting to adopt the final SCM. With that as the primary goal of the EIR, it is important that it be focused to include the specific provisions of the SCM. Thus, we suggest that the Draft Program EIR development be postponed until after the SCM rule is closer to completion, rather than at the beginning of the process.

2-2 We also want to stress that it is important for the parameters included in the Draft Program EIR and the EIR to include all possible regulatory options that may be included in the final rule. If the final proposal or the rule as adopted includes modified VOC content limits from those limits currently under consideration or additional categories, then the Draft Program EIR must include a thorough evaluation of these effects and the impacts of these limits. There have been Environmental Assessments produced by Districts which consider only broad options, e.g. considering to adopt or not to adopt the proposed rule. However, we consider such broad options as these to be inadequate to fully address the Environmental Impacts of the specific rule provisions to be adopted. By considering the impact of various specific limits, the State will be able to decide on the best option, i.e. the most environmentally beneficial and least harmful specific option. Thus, we strongly support including specific variations on

2-2 the "VOC Content Limits and the Final Compliance Deadlines" as one of the alternatives to be included in the Draft Program EIR.

2-3 We also support including the following Alternatives, which were provided in the NOP and Initial Study as "under consideration:"

1. A Low Vapor Pressure Exemption – since this exemption exists in the Consumer Products regulation and has been used for solvent-types of materials in these products, it is fair to include it in the SCM and in the EIR.

2. VOC Content Limits / Final Compliance Deadlines – since it is hoped that the final compliance dates and the VOC content limits will be modified from this initial draft, we believe it is crucial that such modifications be included in the EIR. This should include consideration of VOC limit changes in increments of 50 grams per liter. In addition, consideration should include altering the units for the VOC limits from the current units of grams of VOC per liter of coating less water and exempt compounds to units of grams of VOC per liter of material.

3. Regional Deregulation – This appears to be another plan which might have potential, if adequate information on the specific geographic locations could be included (for example, describing both the regulated and de-regulated areas by city, zip code, and FIPS code).

A number of alternatives are apparently under consideration about which we have strong reservations.

2-4

1. Performance-based Standards – Apparently the State is considering developing emission standards on the basis of VOC emissions per area covered per year, rather than on the VOC content of coatings. Such a plan would appear to be unenforceable, since it could not be based on actual area / emissions per year. It might be based on manufacturer recommendations. However, how would a manufacturer's recommendations for different substrates and substrate conditions be handled? How could such recommendations be compared to "reality?" (There do not appear to be any measurement tools for such units for emissions.) The obstacles to such a plan seem overwhelming – especially in the time frame under consideration.

2-5

2. Reactivity – while the concept of voluntarily adjusting the reactivity to achieve equivalence seems promising, reactivity data on the VOC's found in Architectural Coatings has not been developed. In addition, there does not seem to be a practical mechanism for the use of a voluntary reactivity plan in just a few districts – and yet, with District regulations, that would be needed. In other words, it is impractical to suggest that a manufacturer create another unique formulation for some parts of the State. Currently, the Sherwin-Williams Company has three separate formulations for a number of product lines. For example in the nonflat area, we have three separate sets formulations: the national formulations, the 380 g/l formulations for the regulated areas in New York, New Jersey, Kentucky, Oregon, Washington, and Massachusetts, and the 250 g/l formulation for the regulated areas in California and Maricopa County, Arizona. To add to this a variety of reactivity adjusted formulations for some, but not all, of the regulated areas of California, as well as to reduce the VOC content of the products, will

2-5 be a challenge and may not prove to be practical. It would appear to be more practical if such a plan was developed for statewide usage.

2-6 3. Product Line Averaging – For many reasons, we do not consider Product Line Averaging to be practical. One reason is the issue of individual District requirements and tracking of individual products into multiple numbers of such small areas. (Some Districts are not even the size of an entire County, but are only part of a County.) In addition, many customers operate their own warehouses: we ship to their warehouse, they ship to final points of sale. Such warehouses may be in the State and serve several States and they may be outside of the State and serve this State, as well as other states. If we had to depend on information from each such customer to determine our compliance and averaging status, such a plan would not be practical. Not only would District-specific implementation require manufacturers to tailor and track distributions into each specific District, but it might also require us to have our Distributors do likewise.

2-7 4. Seasonal Approach – This would appear to require manufacturers and retailers to stock and unstock / restock and re-unstock products throughout the year: Jan – March would have higher VOC coatings; these would need to be removed and replaced with lower VOC coatings for April – October; and these would be removed and replaced with the higher VOC coatings for October – March. Such stocking / unstocking / re-stocking is extremely expensive for retailers, distributors, and manufacturers and is ultimately impractical.

2-8 However, if these concepts are under consideration for inclusion in the SCM, then the EIR will need to consider the effects of each of these.

There are several additional divisions / categorizations which we believe may allow some category VOC's to be lowered, while maintaining product quality. These divisions are shown below:

2-9
1. Division of the stain category into the following subcategories with different VOC limits:
    a.. Interior semi-transparent stains
    b. Exterior semi-transparent stains
    c. Interior and exterior opaque (solid color) stains

2-10
2. Division of the industrial maintenance category into subcategories based on performance requirements / markets – examples (not complete nor all inclusive) would include the following:
    a. Immersion service – petrochemicals, chemicals, water, wastewater
    b. Bridges
    c. Zinc Rich Coatings

2-11
3 Division of the primer, sealer, and undercoater categories into the following:
    a. Interior primers and undercoaters
    b. Exterior primers and undercoaters
    c. Interior sealers
    d. Exterior sealers

2-12
4. Division of the nonflat category into the following:

2-12
- a. Floor coatings – single component residential versus multi-component industrial maintenance
- b. Rust preventative coatings (for residential structures)
- c. Interior high gloss nonflats
- d. Exterior high gloss nonflats
- e. Interior nonflats (not high gloss)
- f. Exterior nonfats (not high gloss)

2-13
4. Division of the flat category into the following:
   - a. Interior flat coatings
   - b. Exterior flat coatings

Consideration of these possibilities should be included in the EIR since it is likely that some or all of them could be included in the final SCM to allow maximum VOC reductions with minimum environmental harm and expense.

In addition to the discussion included in the Initial Study for the Draft Program Environmental Impact Report for the Suggested Control Measure for Architectural Coatings, the following Environmental Factors are potentially affected:

2-14 1. Water – the proposal depends on extensive use of waterborne coatings by paint manufacturers. Paint manufacturing operations located within the State will be using more water than currently in paint production. Such increased use of water has the potential to deplete groundwater supplies and lower the local groundwater table level. In addition, since the use of waterborne coatings require much more careful surface preparation, power washing of structures prior to coating applications will become more frequent. This will place an additional burden on the water resources of the State. Thus, the potential depletion of groundwater supplies and the groundwater table level should be considered.

2-15 In addition, the increased use of waterborne coatings may generate increased amounts of wastewater from coating applications. This increase in wastewater may require new or expansion of current water facilities and / or wastewater treatment facilities which may have environmental effects. These need to be considered.

2-16 2. Transportation / Circulation – The seasonal deregulation option will result in a significant increase in the number of deliveries to each retail outlet (this will be doubled) and the number of trucks arriving to pick up "out of season" merchandise (from zero currently to twice a year). In addition, these trucks will need to deliver the returned coatings to warehouses (a trip which does not currently occur.) Such increased deliveries will have multiple serious impacts: it may result in inadequate emergency access to the transportation networks; it can also result in inadequate parking. In addition, such an option and such increased traffic can cause severe environmental harm by increasing emissions from these trucks. (The current regulatory plan can be represented as having "one truck to store encounter" per year; under a seasonal regulatory plan this would be increased to "four truck to store encounters" per year (one to remove high VOC, two to deliver low VOC, three to remove low VOC, and four to deliver high VOC.) Such a four-fold increase in truck traffic needs to be considered.

2-17 3. Energy and Mineral Resources – As discussed above the seasonal deregulation option will result in a significant increase in the number of truck "visits" to each retail outlet per year. These extra trips use extra gasoline, that would not have been consumed otherwise.

2-18 In addition, if a category labeling requirement is adopted, labels or data pages will become obsolete faster. This will necessitate production of additional new labels, at a significant cost to environment. This cost will be without a corresponding environmental benefit, since including the category on the label (or on a data sheet) does not reduce emissions, nor does it make it more likely or less likely that the category is correct for the District rules. With seventeen Districts within the State currently regulating architectural coatings and with nine additional areas regulating these coatings, there is a high potential for amendments. These amendments would result in revision of the data pages or labels. With 26 areas involved, it is probable that such amendments and revisions could occur multiple times each year. All of the natural resources and energy expended in the production of and printing on paper would be without environmental benefit, since such a labeling requirement does not provide emission reductions.

2-19 4. Hazards – In section IX (b) the handling of hazardous materials within ¼ mile of a school may have a Potentially Significant Impact. The possible use of acetone (which is hazardous based on its high flammability) and the use of glycol ethers (potentially in waterborne coatings) and diisocyanates (in polyurethane coatings) in the neighborhood of a school, as well as in school structures themselves should not be ignored.

2-20 It is important to consider that currently the most prevalent solvent used in solventborne architectural coatings is mineral spirits, and that mineral spirits are neither carcinogenic nor teratogenic. Additionally, ethylene glycol ethers and ethylene glycol ether acetates are commonly used in water-borne architectural coatings. Since the proposed VOC limits will essentially eliminate the use of mineral spirits and will increase dramatically the percentage of the market based on waterborne technologies, it is logical to assume that more ethylene glycol ethers and ethylene glycol ether acetates will be used than are currently in use. It is important for the potential health effects of this switch in solvents be considered in the EIR.

2-21 In addition, the discussion of hazards did not include a discussion of the increased use of sand blasting to prepare surfaces for coating with waterborne systems. Such sand blasting can cause exposures to crystalline silica, a Proposition 65 carcinogen. Again, this can happen at a school, as well as within ¼ mile, and is more likely under the current proposal, since it essentially eliminates solventborne primers and will thus necessitate more thorough substrate preparation. Waterborne coatings require more thorough surface preparation, compared to solventborne coatings. Abrasive blasting will be needed more often to prepare these architectural surfaces than is currently the situation. These operations generate hazards associated with some of the abrasion elements, as well as noise (see below). In addition, since architectural coatings used in residential settings will require such abrasive blasting more often then currently, and since such settings may expose young children to such hazards, these impacts need to be considered. The lack of solventborne primers is especially critical in this discussion, since currently they can serve as a preparatory step prior to the application of a waterborne topcoat.

2-22 5. Noise – The Initial Study for the Draft Program EIR discussed the idea that with the adoption of reduced VOC content limits, more coatings would be waterborne. However, the discussion failed to consider that waterborne coatings require more thorough surface preparation, compared to solvent-borne coatings. More often power washing and abrasive blasting will be needed to prepare these architectural surfaces. These operations generate noise, as well as hazards associated with some of the abrasion elements (see above). Evaluation should consider that waterborne coatings are less forgiving than solventborne coatings, and thus require more extensive surface preparations, including abrasive blasting. In addition, since architectural coatings used in residential settings will require such abrasive

2-22 blasting more often then currently, and since such settings will expose young children to such noises, these impacts need to be considered. The lack of solventborne primers is especially important in this respect. We expect either a substantial temporary, periodic, or permanent increase in ambient noise levels above the levels currently existing may occur and should be evaluated (response to X c) and d) should be Potentially Significant Impact.)

2-23 6. Public Services – We believe there are some additional Potentially Significant Impacts that need to be considered. The proposal removes single component solventborne coatings from all effected categories. This will increase the use of waterborne coatings, and reduce the painting season to the warmer and drier months. Thus, pubic facilities – and especially parks – may not be available for use as often as they are currently. In addition, if the extreme reductions in VOC's result in more frequent applications of coatings, then all facilities – including public services – may be severely impacted and unavailable for periods of time when they otherwise would have been available.

2-24 7. Solid / hazardous waste – The discussion should include the potential for increased sand blasting and the wastes associated with this operation. In addition, the proposed limits for industrial maintenance coatings will result in increased usage of multi-component systems, where single component systems are currently used. These multi-component systems have a limited pot life (i.e. the time period allowed from mixing the components to application); once the pot life is exceeded the material is waste. Thus, the increased use of multi-component systems can result in increased non-waterborne solid and hazardous wastes.

2-25 8. Aesthetics and Cultural Resources – The proposal may jeopardize the maintenance of historic buildings. The unavailability of traditional coating technologies to maintain these structures will – at a minimum – make maintenance of these buildings more difficult; in the worst case scenario it may not be possible to find acceptable substitute products to maintain both the historical integrity and the physical integrity of these structures. This is especially problematic with the elimination of solvent-borne primers, as well as for the second tier reductions with flat and nonflat coatings at 50 g/l.

We hope our comments on the Notice of Preparation (NOP) of a Draft Program Environmental Impact Report (EIR) and on the Initial Study for the Draft Program Environmental Impact Report (EIR) for the Suggested Control Measure for Architectural Coatings are helpful.

If additional information is needed, please feel free to contact me by telephone at (216) 566-2630, by facsimile at (216) 263-8635, or by electronic mail at mkharding@sherwin.com.

Sincerely,

Madelyn K Harding

Madelyn K. Harding Administrator,
Product Compliance & Registrations

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July 22, 1999

Mr. Jim Nyarady,
Manager,
Strategy Evaluation Section,
Stationary Source Division,
California Air Resources Board
2020 L Street
Sacramento, California 95812

Dear Jim:

Thank you for affording the National Paint and Coatings Association (NPCA) the opportunity to comment on the Initial Study for the Draft Program Environmental Impact Report for a Suggested Control Measure (SCM) for Architectural Coatings, dated June 1999.

As was stated in the June 1999 document, the Initial Study is intended to provide information about the proposed project in order to allow comment on the scope of the environmental analysis and possible project alternatives of the Draft Program Environmental Impact Report (EIR). We understand from this that there will be an additional opportunity to comment on the Draft Program EIR itself when it is issued.

We have been actively involved with your agency's recent efforts and those of the South Coast Air Quality Management District (SCAQMD) to establish lower VOC limits for AIM coatings. In this connection we have attended workshops held by CARB on this matter and have submitted initial comments on the SCM. Also in connection with the SCAQMD's recent revisions to Rule 1113, we provided comments to that agency's Initial Study for the draft Subsequent Environmental Assessment (SEA), in particular the scope of the environmental analysis and possible project alternatives. Because the VOC limits proposed in the SCM are similar to the revised limits of Rule 1113 and because the SCM relies heavily on the conclusions of the SCAQMD concnring the Rule 1113 revisions, we have attached a copy of our comments on the SCAQMD's SEA. (See APPENDIX A.)

Our comments on CARB's EIA follow.

SUGGESTED ALTERNATIVE EFFECTIVE DATES

Crucially affecting the environmental impact of the SCM will be the effective dates of the revised VOC limits.

3-1 We question whether it is necessary for the SCM to specify compliance dates at all, in as much as the SCM is only a suggested measure for consideration by the local air districts which must in turn adopt it through formal rulemaking before it could be effective. This is particularly true in light of the technology forcing nature of the proposed limits. As we commented concerning the limits as they were being considered by the SCAQMD, many are not within the reasonably foreseeable technology of the industry. A more reasonable approach may be to specify time frames when it is believed (hoped) that technology may be available to meet lower VOC limits.

3-2 In this regard we note that the June 1999 Notice of Preparation states the following:

> The primary objective of the proposed SCM is to set VOC limits and other requirements that are feasible (**based on existing and currently developing coatings technology**) and that will achieve significant reductions in VOC emissions from architectural coatings. (page 1-7)

As you know from our discussions with CARB and the SCAQMD, we have serious reservations about the ability of the industry to develop effective coatings at the VOC limits specified in the SCM, based on "existing and currently developing coatings technology". (See Appendix A.)

Also to the extent that technology might be developed, the longer time period that is afforded, the more improved are the opportunities for technology developments.

3-3 With this in mind, we suggest that the EIR evaluate the implementation of a first round of reductions for 2004. A second round of reductions should not be considered until there has been some experience with the first round of reductions. Instead of a second round of reductions being specified in the SCM, an Increments of Progress Program should be established for a second round of reductions effort, under which industry would supply information concerning the feasibility of additional reductions in VOC emissions from AIM coatings.

SUGGESTED ALTERNATIVE SCM PROVISIONS

3-4 In our June 7, 1999 comments concerning the SCM, we made several suggestions for changes to its provisions. These are attached in Appendix B and we incorporate them by reference. The EIR should evaluate the impact of making these changes. We believe that the over all efficacy of the rule would be

3-4 improved by the adoption of our suggestions. Additionally, there are several other specific comments from our members that we draw your attention to and endorse for your consideration.

PROJECTED EMMISSIONS REDUCTIONS

3-5 The projected emissions reductions should be evaluated in the EIR on the basis of the assumption that many of the projected VOC limits will not be technologically feasible. The impact of no effective coatings being available for many of the current applications should be considered as a distinct possibility and should be assessed for its impact upon projected emissions reductions.

THE LISTED ALTERNATIVES

3-6 We concur in the consideration of the alternatives listed at page 1-9. We note here that the last listed alternative that is raised for consideration includes the possibility of different VOC content limits and compliance dates than those specified in the SCM, a point we have suggested.

THE ENVIRONMENTAL CHECKLIST

3-7 We agree with the determination that the proposed project may have a significant effect on the environment and an environmental impact report is required.

3-8 With respect to the delegation of cost considerations to the Economic Impact Analysis, we believe that there would be significant costs associated with proposed limits and that they must be addressed. We concur in the delegation of their consideration to the Economic Impact Analysis.

3-9 With respect to the water environmental impacts, we believe that there may be substantial negative effects if lower VOC coatings are required for the water and sewage system infrastructures. The same would be true for tank lining and piping of infrastructure that contains or holds hazardous materials, the release of which could contaminate water supplies.

3-10 With respect to aesthetic considerations, we believe that the elimination of existing effective anti-graffiti coatings should be considered as an impact.

3-11 With respect to recreation considerations, the possibility of lower VOC coatings not adequately meeting the needs of the infrastructure at such facilities should be considered.

3-12 With respect to solid waste/hazardous waste issues, there is the possibility that there would be increased use of higher solids two pack systems, and that this could affect hazardous waste considerations.

APPENDIX A

December 1, 1998

Mr. Darren W. Stroud
Office of Planning, Transportation and Information
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765-4182

RE: Comments on the Initial Study for the Draft Subsequent Environmental Assessment for Proposed Amended Rule (PAR) 1113 - Architectural and Industrial Maintenance (AIM) Coatings

The NPCA is providing comments on the South Coast Air Quality Management District's Initial Study for the draft Subsequent Environmental Assessment (SEA), in particular the scope of the environmental analysis and possible project alternatives. In addition we are our submitting our initial comments on a number of other pertinent issues that are involved in this rulemaking. Further detailed comments on the proposed revisions to Rule 1113 (definitions, limits and compliance dates, etc.) will be provided during the remainder of the rulemaking process.

General Comments on Proposed Amended Rule (PAR) 1113

3-13 The District is unnecessarily moving ahead on a fast track rulemaking schedule before all of the pertinent data is available to the District which is essential to making an informed decision concerning the technological and economic feasibility of the proposed revised VOC limits under Rule 1113.

This pertinent data includes the National Technical System (NTS) comparative study and the CARB AIM emissions inventory. The District's fast track rulemaking schedule precludes sufficient time for an open and thorough examination and discussion of the results of these two extremely important studies.

We have four major recommendations for the District:

- 3-14 Postpone the currently scheduled February 12, 1999 presentation on the PAR 1113 to the SCAQMD Board until both the NTS comparative study and the CARB inventory are completed and the regulated community, which includes chemists with extensive knowledge of the paint technology issues involved in this matter, has an opportunity to review and discuss the findings of the studies with District staff.

- 3-15 The NTS should be expanded to include ongoing real world weathering and durability testing that manufacturers and applicators can monitor in the future.

- 16 The District relies for much of its proposed lower VOC coatings limits on currently available low VOC coatings technology. A low VOC product technology may be successfully used currently to meet the performance requirements of one particular application and exposure environment of a general class of coatings. However, there must first be a thorough evaluation of this technology before it can be mandated as being feasible for all or even most of the application, performance, and exposure requirements of the general class of coatings to which it belongs. For example, an expectation that currently availablel ow VOC non-flat coatings could effectively replace **all** other non-flat coatings currently in the market place is completely at odds with the history of advances in coatings technology. Reliance on such an expectation to guide the District's inquiry would be dangerously misguided. There is no substitute for a thorough, open minded, and objective evaluation of existing and reasonably foreseeable coatings technologies in setting future VOC limits.

- 3-17 The SCAQMD AIM rule should adopt the national AIM rule as a template, incorporating the national rule's product definitions, reporting and labeling requirements, as well as the national rule's "less than or equal to" one liter package size exemption. It must be acknowledged that the SCAQMD will specify much lower VOC limits for coatings than those of the national rule. This may necessitate the greater division of separate coatings categories in the SCAQMD AIM rule than those that exist in the national rule. But the basic components of both rules should be as uniform as possible to reduce the inefficiencies associated with having to address the special VOC reduction needs of the SCAQMD.

Alternatives

3-18 The Initial Study lists seven possible alternatives that are currently under consideration for inclusion in the Draft SEA. Below are our initial comments on each of these possible alternatives along with some suggestions for additional alternatives that merit discussion.

Low Vapor Pressure Exemption

3-19 The effect of establishing a low vapor pressure exemption may only have limited impact on the ability of the manufacturers to meet the currently proposed VOC limits. The impact would depend on where the exemption would be set and the solvents that would be thereby exempted. Further public discussion of this possible alternative is needed. This exemption should be addressed in the Draft SEA.

Performance-based Standards

3-20 Use of performance-based standards looks like a viable alternative approach but it is fraught with numerous problems and controversies particularly for the DIY (do-it-yourself) market products. For certain specialized categories of coatings, such as industrial maintenance (IM) coatings, it may be a viable alternative. Most IM products already are formulated and certified to meet a specific set of performance requirements established by a professional standard setting group such as ANSI/ NSF/ASTM. The draft SEA should discuss this alternative approach.

Reactivity

3-21 The use of reactivity in setting regulatory limits holds out the possibility of providing coatings manufacturers with additional flexibility in meeting the revised limits and may allow some current coatings technologies to continue to be marketed. Our support for using reactivity as a regulatory criterion will depend on how it is employed by the District. We would oppose its employment in a manner that would only add to regulatory burdens without any tangible benefits for the environment, e.g., requiring reformulations of coatings that already have been reformulated to reduce VOC content for some marginal additional improvement in reducing ozone on the basis of reactivity. In any case, we support the continued evaluation and research concerning the possible application of this alternative. The draft SEA should address this alternative.

Product Line Averaging

3-22 Again this alternative may offer the possibility of added flexibility for the manufacturer in meeting the revised VOC limits. The current administrative requirements of the averaging provision seem to be unnecessarily burdensome particularly for national or regional marketers of AIM products. It would be of interest to know how many companies have taken advantage of this alternative since it was incorporated into Rule 1116 in 1996. We are awaiting the further discussion of this alternative.

Regional Deregulation

3-23 Of the several alternatives proposed by the District, this is the most difficult to currently evaluate in that it is contingent on an anticipated fundamental change in the District's VOC/NOx mix. In principle, however, we believe it is worth while to explore all avenues that offer the possibility of cost-effective measures to reduce ozone formation in the District.

Seasonal Approach

3-24 The use of a seasonal approach to the regulation of AIM products appears attractive, allowing for the use of higher VOC products during periods when ozone does not form. However, the great majority of coatings manufacturers have very serious reservations about how such a program could be implemented as a practical matter.

VOC Content Limits/Final Compliance Deadlines

It is the position of the NPCA that the VOC Limits and Compliance deadlines proposed in the attached Appendix A - Proposed Amended Rule (dated October 23, 1998) are arbitrary and are not technically and economically feasible on the basis of reasonably foreseeable coatings technology developments. The NPCA and individual member companies will provide more detailed comments on this matter during the future rule development process. But for the present it is important to note that we have carefully reviewed these limits with coatings technology experts in our member companies, several of which have staked out low VOC coatings as a major market and have for decades devoted millions of dollars to research and development of such coatings.

3-25 It is the consensus of our membership that all of the proposed revised VOC limits proposed in this rulemaking suffer from on or more of the following defects:

- There is no reasonably foreseeable technology that would achieve the limit.
- The limit might be completely appropriate for some applications in a coatings category but completely inappropriate for others.
- The limit might be achieved but at unacceptably high additional costs (e.g., limiting IM coatings to two-pack systems).

We again urge the District to hold off any further drafting of the proposed revisions to Rule 1113 until the results of the NTS comparative study and the CARB 1998 architectural emission inventory are available and have been discussed in a public forum.

Additional Regulatory Alternatives

Development of More Specific Categories

3-26 As the District moves to lower the VOC content limit of an AIM coatings category, the number of coatings that can exist under that category for particular requirements are diminished unless the lower VOC technology mandated by the new limit can accommodate such coatings. Unfortunately, this is not always feasible and this is particularly true at the very low VOC limits being proposed. As the District looks to lower the VOC content of AIM products, the District should work with coatings manufacturers and users to identify those specific applications that can not be technically or economically reformulated or replaced by a lower VOC product at the proposed limits.

The District has indicated that such a process is impractical. Aside from the District's obligation to thoroughly evaluate the technological and economic feasibility of its proposed limits, which would include determining which applications would be eliminated by its proposed limits and the impact of the elimination, we note that this process of further refining coatings categories already has been accomplished in the development of the national AIM rule. The national rule provides category definitions on which a discussion of the identification and expansion of the list of categories for Rule 1113 could begin. The expansion of the number of categories will allow the District to lower the VOC limits for those coatings applications where the lower limits can be effectively achieved while ensuring that the limits do not apply to coatings applications for which they would not be feasible.

Alternative Methods for Determining VOC Content of Low VOC Products

3-27 As the VOC limits of AIM coatings are lowered the District needs to evaluate the use of alternative methods for determining VOC content. For very low VOC (less than 75 g/l) coatings, Method 24 (the less water method) can give false and erroneous VOC determinations. This situation is analogous to the situation with low solids coatings where the District and EPA have recognized the need for a modified test to determine VOC content. We believe that the Draft SEA should include a discussion of the test method for determining VOC content of low VOC products.

Fees

3-28 The draft SEA should explore an option that would allow purchases of noncompliant coatings on payment of a fee, similar to the system that exists in the national AIM coatings rule.

Environmental Checklist

We believe that the PAR 1113 could have significant effects on the environmental factors identified in Chapter 2 pages 2-3 to 2-14 of the Draft Environmental Assessment Initial Study. We also want to identify areas of concern in addition to those identified by the District that should also be addressed in the Draft SEA document.

IX. Hazards

We do not agree with the District's finding that "...the project-specific human health impacts associated with the implementation of PAR1113 are considered insignificant...." As manufacturers are forced to supply lower and lower VOC products, the number of formulating options will be more limited and the focus will be on the use of higher and higher molecular weight polymers. As the molecular weight of the polymers increases so do the risks of increased safety and health impacts. Higher molecular weight polymers are by their nature more reactive and thus potentially present increased exposure hazards. 3-29

For example – with the move to a 50 g/l VOC limit for a non-flat coating in 2005, there will be increased pressures for the use of specialized coatings (e.g., two-pack systems) in high traffic commercial and the do-it-yourself (DIY) market. This could in turn increase the exposure of untrained applicators and DIY'ers to increased skin and inhalation hazards. The District should include an evaluation of these hazardous in the Draft SEA.

XII. Utilities and Service Systems

c. Landfills.

3-30 With the expected increase in the use of two-pack systems, particularly by untrained applicators, there no doubt will be an increase in the amount of unusable cured two-pack materials that have solidified before they could be applied. Thus a foreseeable impact on both solid and hazardous waste disposal handling facilities and landfills will be an increase in these waste streams.

We greatly appreciate the opportunity to comment on this initial draft and we look forward to further participation in the revision of the rule.

Sincerely,

Robert J. Nelson
Director, Environmental Affairs

Jim Sell
Senior Counsel

APPENDIX B

Initial Comments 6/7/99

NPCA Recommended Changes to the ARB's 5/19/99 Draft Suggested Control Measure for Architectural Coatings

1. **Effective Dates**

3-31 The effective date for the first revision of the VOC limits should be no earlier than July 1, 2004. If shown to be technical feasible, the effective date for the second round of VOC emission reductions would be no earlier than July 1, 2008. We would be happy to discuss our reasoning for these recommended changes in effective dates.

2. **Proposed Limits**

3-32 The proposed changes to the Table of Standards of VOC limits should be the focal point of discussions at the July 1, 1999 workshop. NPCA will reserve its comments on individual limits until the NOP is released. For the second round of VOC emission reductions, the reduction of individual category limits should be eliminated and replaced by a " Increments of Progress Program". A detailed description of such a program will be provided before the next workshop.

3. **Categories and Definitions**

General Recommendations for the Revision of SCM

33 As we stated in our earlier comments to the ARB staff, the ARB should adopt the national rule as a template, incorporating all of the national rule product definitions, reporting and labeling requirements. Due to the unique conditions in the portions of California, we acknowledge that ARB may have to specify lower VOC limits for some categories of coatings than those in the

3-33 national rule. But the basic components of both rules should be as uniform as possible to reduce the inefficiencies associated with having to address the special VOC reduction needs of portions of California. The adoption of the national rule as a template, with its sixty-one categories and subcategories, would assist industry in more readily identifying categories where additional VOC reductions might be obtained, In part this is true because these coatings are sold in large volumes on a national basis and thus are the beneficiaries of focused research and development efforts to lower VOC content.

3-34

Additional Categories and Subcategories:

As a practical matter as the ARB considers the lowering of the current VOC limits for some of the largest and most important categories of AIM products (Industrial Maintenance, Flats, Non-flats, Primers, Sealers and Undercoaters, Stains and Waterproofing Sealers) the ARB must also consider the further subcategorizing of these national recognized categories and the inclusion of additional coatings categories for a number of special end use high performance AIM products that are currently covered by one of these board coatings categories. By doing this the ARB may be able to lower the VOC limit for a general category or subcategory of coatings within a broad category to take advantage of the availability and/or emerging technology while ensuring that the limits do not apply to coatings applications for which they would not be feasible and thus causing irreparable harm to manufacturers and coatings users of the these special products.

- At a minimum following categories should be added to the Table of Standards (TOS):
    1. Tank Lining and Piping Coatings
    2. Specialty Primers
    3. Interior Semi-Transparent Stains

In addition, a separate category for "High Gloss Non-Flats should be considered.

- The SCM should also incorporate any additional changes in the definitions that are made to the SCAQMD Rule 1113 during the ninety day review period.

3-35

- The following definitions for all of these new categories should be included in the Definitions Section of the rule.

TANK LINING AND PIPE COATINGS means an industrial maintenance coating formulated and recommended for application to the interior surfaces of storage tanks and reservoirs and associated piping exposed to immersion in water, wastewater, organic solvents and chemical solutions (aqueous and non-aqueous solutions).

(This category would replace the chemical storage tank coating category that has been added to Rule 1113)

INTERIOR-SEMI-TRANSPARENT STAIN is a coating formulated for interior use that produces a dry film with minimal coloring that does not completely conceal substrate or its natural texture or grain pattern.

SPECIALTY PRIMER is a coating formulated and recommended for application to a substrate to block stains, odors, or efflorescence; to seal fire, smoke or water damage; or to condition excessively chalky surfaces.

An excessively chalky surface is one that is defined as having chalk rating of four or less as determined by ASTM D-4214 - Photographic Reference Standard No.1 or the Federation of Societies For Coatings Technology "Pictorial Standards for Coatings Defects".

PDCA
PAINTING AND DECORATING CONTRACTORS OF AMERICA
Voice of the Professional Painting and Decorating Contractor

STEPHEN B. MURPHY
PDCA EXECUTIVE COMMITTEE

RESPOND TO:
Murphy Industrial Coatings
2704 Gundry Avenue
Signal Hill, CA 90806
Tel: 562/427-7720
Fax: 562/426-6751
e-mail: steve.murphy@ ibm.net

June 29, 1999

State of California
Air Resources Board
2020 L Street
Sacramento, CA 95812

FAX & MAIL

Attention: James Nyarady

Reference: SCM For Architectural Coatings

Subject: Proposed Changes

4-1 Per our meeting this morning, PDCA is strongly opposed to CARB's proposed changes to the Suggested Control Measure (SCM) for Architectural Coatings. PDCA strongly recommends the following process to deal with any proposed changes to the SCM to avoid the errors that SCAQMD made in its May 14, 1999 approval of the proposed amendments to its Rule 1113:

1. Establish a joint agency/industry working group with consensus goals, procedures, and timeframe to develop recommended proposed changes.
2. Move the target completion date from year-end to June of next year to allow time for this process to work.
3. CARB should assume the leadership role in dealing with an ongoing issue that has national ramifications, now that SCAQMD has failed in its leadership.
4. CARB should re-establish trust in the regulatory process by working with industry in a more reasonable and credible manner than SCAQMD.

4-2 The recent initial steps taken by CARB in developing the proposed changes appear to mirror SCAQMD's approach. SCAQMD's approach ended on May 14, 1999 in a disaster resulting in litigation and the loss of industry's trust in working with a governmental agency. The same process proposed by CARB will provide the same results.

4-3 CARB right now has an opportunity to serve the people of California by establishing itself as a leading regulatory agency that can meet and resolve issues by developing a working relationship with industry to find the best ways of protecting our environment while meeting the needs of industry and consumers.

Please call me if you have any questions concerning PDCA's recommendation.

PDCA

Stephen B. Murphy
President

SBM:nb

c: PDCA California Council
PDCA Golden State Council
NPCA
SSPC
EL RAP

Subject: CARB Comments (corrected copy)
Date: Fri, 23 Jul 1999 16:52:39 -0400
From: Monica Pierce <pierce@sspc.org>
To: "Jim Nyarady" <jnyarady@cleanair.arb.ca.gov>
CC: "Bernard Appleman" <appleman@sspc.org>

Mr. Nyarady,
Bernie did make a few changes. Here is the final version.

-Monica

July 20, 1999

Air Resources Board
2020 L St, P O Box 2815
Sacramento, CA 95812
Attention: Mr Jim Nyarady

Subject: SSPC Comments on ARB Suggested Control Measures for Architectural Coatings

SSPC is a not-for-profit technical organization representing facility owners (public and private), applicators, and suppliers of materials, equipment and services. SSPC has a history of cooperating with environmental health and safety regulatory organizations to minimize the impact of coatings operations on the health and welfare of the public and the work force.

SSPC's members use or supply coatings in the class defined as industrial maintenance.
SSPC's comment are primarily directed at this category, although they may also be
applicable to related categories such as rust preventive coatings.

SSPC's comments are as follows:

1. Industrial Maintenance Coatings: 2002 level of 250 g/l

The ARB has proposed the levels issued by SCAQMD. The latter have encountered
considerable opposition from industry groups including SSPC.

The technology for coatings at 250 g/l is not proven for several types of exposure.
5-1 These include linings for tanks containing aggressive chemicals such as acids, bases,
solvents and oxidizers. For potable water tank linings the technology is marginally
available at 250 g/l but there is a steep learning curve for the specifiers and applicators,
and three years is insufficient time for these to be implemented (e.g., requalification by
NSF standards, laboratory, and service testing). In addition, SSPC has contacted IM
coating suppliers to determine the VOC level achievable for exterior aggressive
exposure (e.g., UV along with moisture, salt, chemical fumes,
temperature extremes). Perhaps the most successful product for this
5-2 application has been polyurethanes, which are not available with VOCs
less than 300 to 320 g/l. This proposed SCM would essentially
eliminate the current generation of polyurethanes. Any replacements would be based on
as yet unproven technology or on use on often cumbersome and expensive component
equipment. The imposition of this rule is expected to result in early failure and the need for

more frequent repainting.

2. Industrial Maintenance Coatings: 2006 level of 100 g/l

5-3 This level was also based on SCAQMD's rule making. This level is unachievable with today's technology. So ARB, like SCAQMD, is suggesting a rule based on speculation on advances in technology. This approach is not appropriate. In our view, it is not normally a major problem to formulate a coating with reduced or zero level of VOC. Any competent formulator can achieve this level. However performance and application properties are needed for industrial maintenance (as well as other) coatings. There is little if any substantiated performance data on coatings with VOC of 100 g/l or less except for a few specialized applications (e.g., floor coatings).

3. Metallic Filled Coatings

5-4 The ARB proposed definition of this category excludes zinc. This exclusion is very surprising in view of the fact that virtually all other regulatory bodies have included zinc. Zinc-rich coatings are the foundation of many IM coating systems. Zinc-rich coatings at 250 g/l have not been proven for field application (e.g., Caltrans has used waterborne inorganic zincs for 20 years but they are not specified for field applications). Waterborne inorganic zinc (which has close to zero VOC) is considered by the vast majority of applicators and specifiers to be unsuited for field application. The industry has experienced far too many failures with these products. We are not aware of any advances in equipment or materials handling or application properties of these coatings which would be needed to make these coatings suitable for field application.

SSPC appreciates the opportunity to submit these comments and would be willing to discuss in further detail any of the above comments.

Respectful submitted,

Bernard R. Appleman
Executive Director, SSPC: The Society for Protective c"0

Monica Pierce
Accounting/Administration Specialist
SSPC: The Society for Protective Coatings
40 24th Street, 6th Floor
Pittsburgh, PA 15222

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Visit us at www.sspc.org
Join us at SSPC'99 in Houston, Texas Nov. 14-19!

Subject: CARB comments
Date: Tue, 20 Jul 1999 17:01:22 -0400
From: Monica Pierce <pierce@sspc.org>
To: "Jim Nyarady" <jnyarady@cleanair.arb.ca.gov>
CC: "Bernard Appleman" <appleman@sspc.org>

Before Bernard Appleman left this afternoon for Cleveland, he asked me to edit his comments and send them to you. There may be some technical inaccuracies due to my lack of knowledge/terminology and his (Bernie) absence to proof. He will return to the office on Friday 7/23. If you have any questions you may call me at ext 213 or Bernie at ext. 234. Please confirm receipt of this email.

Sincerely,

Monica Pierce
Temporary Executive Secretary

July 20, 1999

Air Resources Board
2020 L St, P O Box 2815
Sacramento, CA 95812
Attention. Mr Jim Nyarady

fax: 916-322-6088
email: jnyarady@arb.ca.gov

Subject: SSPC Comments on ARB Suggested Control Measures for Architectural Coatings

SSPC is a not for profit technical organization representing facility owners (public and private), applicators, and suppliers of materials, equipment and services. SSPC has a history of cooperating with environmental health and safety regulatory organizations to minimize the impact of coatings operations on the health and welfare of the public and the work force.

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This level was also based on SCAQMD's rule making. This level is unachievable with today's technology. So ARB, like SCAQMD is suggesting a rule based on speculation of advances in technology. This approach is not appropriate. In our view, it is not normally a major problem to formulate a coating with reduced or zero level of VOC. Any competent formulator can achieve this level, however performance and application properties are needed for industrial maintenance (as well as other) coatings. There is little if any substantiated performance data on coatings with VOC of 100g/l or less except for a few specialized applications, (e.g., floor coatings).

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SSPC appreciates the opportunity to submit these comments and would be willing to discuss in further detail any of the above comments.

Respectful submitted,

Bernard R. Appleman
Executive Director, SSPC: The Society for Protective Coatings

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Visit us at www.sspc.org
Join us at SSPC'99 in Houston, Texas Nov. 14-19!

yes [illegible]

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EMERITUS
ERNEST M. CLARK, JR.

June 25, 1999

VIA FEDERAL EXPRESS

AIR RESOURCES BOARD MEMBERS
2020 L Street
Sacramento, California 95814

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Physician and Surgeon Member

Ms. Sally Rakow
Public Member

Mr. Ron Roberts
Supervisor, San Diego County
San Diego AQMD Member

Re: Architectural Coatings Suggested Control Measure

Dear ARB Board Members:

Introduction

We are counsel for the Environmental, Legislative, and Regulatory Advocacy Program of the California Paint and Coatings Industry Alliance (the "California Paint Alliance"), a leading California paint industry trade association on regulatory matters, the Allied Local and Regional Manufacturers Caucus (the "ALARM Caucus"), a national paint industry trade association concerned with such matters, and various individual paint manufacturers, retail paint dealers, and painting contractors who are headquartered or do substantial business in California.

6a-1 Our clients received a letter, dated May 5, 1999 from your staff inviting them to a public workshop on June 3, 1999 to discuss draft proposed changes to ARB's suggested control measure (last amended in 1989) on architectural coatings. On May 6, 1999 your staff wrote a letter to South Coast AQMD expressing "support" for amendments to its Rule 1113 which would outlaw virtually all architectural coatings on the market. On May 14, 1999 your staff personally appeared before the South Coast AQMD board at a public hearing and, again, expressed "support" for adoption thereof.[1] Our clients have also received the staff's May 19, 1999 letter enclosing "the draft proposed SCM," which is very similar to the South Cost AQMD's amendments. That letter discusses both (a) the approach of "more closely aligning" the proposed SCM with recent amendments, adopted November 8, 1996 and May 14, 1999, to South Coast AQMD's Rule 1113 and, alternatively, (b) the staff's supposed collaboration with districts "to harmonize the SCM's provisions as much as possible" with EPA's architectural coatings regulation imposed nationwide, including in California, on September 11, 1998. We appeared at the June 3 workshop, and your staff appears determined to continue in its effort to follow South Coast AQMD.

A quick look reveals to anyone that it is impossible to "harmonize" the SCM with EPA's new national rule and also to "closely align[]" it with South Coast AQMD's recent amendments. EPA's and South Cost AQMD's actions are based on fundamentally conflicting rationales. The limits in South Coast AQMD's radical and unprecedented new amendments are many times lower than those in EPA's rule.

The ARB staff's recent statements to South Coast AQMD, its draft proposed SCM, and its posture at the workshop make quite clear that the staff has concluded that (1) ARB should amend its SCM at this time, (2) ARB should not "harmonize" those amendments with the new EPA rule, (3) ARB should, instead, "closely align[]" those amendments with the new South Coast AQMD amendments, and

---

[1] One of the few board members to express his reasons for voting for the bans cited the ARB staff's "very clear statement."

6a-1 (4) no prior independent economic nor environmental review by ARB was needed to support those conclusions.

In this letter, our clients make and defend four basic points:

6a-2
- **ARB SHOULD NO LONGER REGULATE ARCHITECTURAL COATINGS.** As a result of EPA's new nationwide regulation of architectural coatings, promulgated September 11, 1998, California regulations, including the SCM and the proposed amendments thereto, are no longer consistent with federal law and, therefore, now violate state law. Indeed, California regulations covering the manufacture and sale of paint are now unconstitutional, because they have been preempted by EPA's new rule under the Supremacy Clause of the U.S. Constitution.

6a-3
- **ANY ARB REGULATION OF ARCHITECTURAL COATINGS SHOULD SET REASONABLE LIMITS AND DEADLINES.** Most state and local jurisdictions in America have elected not to regulate architectural coatings at all. The few agencies which have done so have, in the overwhelming number of cases, set reasonable limits and deadlines aimed at reducing excess organic compounds, not outlawing products. ARB set limits in 1981 and again in 1984, as did EPA in 1998, which refrained from counter-productive and anti-competitive bans. Most limits set by most districts in California have also avoided such extreme consequences. Even most of the rulemaking actions taken by South Coast AQMD, itself, during the past 22 years have been supported or unopposed by industry. If ARB continues to be active in this unique field at all, it should follow this well-established consensus in the regulatory community.

6a-4
- **ARB SHOULD AVOID THE CATASTROPHIC ERROR OF OUTLAWING VIRTUALLY ALL PAINTS.** South Coast AQMD, alone among all agencies in the nation, has recently lost its senses and banned most architectural coatings. This irrational step, and the growing public outcry it is exciting, will discredit South Coast AQMD in particular and all clean air regulation in general. The ARB staff should rethink the irresponsible position it prematurely took in May. The ARB board should not follow this approach and, indeed, should exercise

6a-4 leadership to restore reason to the statewide clean air program. It should rebuke South Coast AQMD's ill-considered and, we believe, ill-fated action, and it should decline to endorse any similar recommendation from the ARB staff.[2]

6a-5
- **ARB MAY NOT PROCEED FURTHER WITHOUT THE REQUIRED ECONOMIC AND ENVIRONMENTAL ANALYSES.** Proposing and adopting SCM amendments, especially amendments as revolutionary as those favored by your staff, presuppose careful analyses of the economic and environmental consequences thereof and of viable alternatives thereto. Indeed, such analyses are mandated under the Administrative Procedure Act and the California Environmental Quality Act. ARB's staff has jumped to its absurd conclusions without having performed these analyses. The board must insist that such analyses be performed promptly, if ARB is determined to proceed further at all.

The factual and legal support for the above four points is detailed in part II below. But, first, because the ARB board members are new to this subject, which has not been considered by ARB since 1989, we set out certain key background information in part I.

I. FACTUAL BACKGROUND

A. OZONE POLLUTION AND ARCHITECTURAL COATINGS

6a-6 As you know, excessive amounts of ozone, although both natural and invisible, cause transient irritation to the lungs of active or sensitive persons during summer afternoons. Ozone is the type of air pollution to which federal, state, and local regulators devote most of their regulatory attention.

The primary precursors of ozone are oxides of nitrogen, emitted mainly by motor vehicles, but also other industrial combustion sources. National Research Council, *Rethinking The*

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[2] Our clients intend to petition ARB to revoke its prior adoption of the South Coast AQMD's 1996 amendments as SIP revisions, and not to adopt its 1999 amendments.

6a-6 *Ozone Problem In Urban and Regional Air Pollution* (National Academy Press, Washington, D.C.,1992) at 7, 11.

6a-7 Organic compounds may also play some role in ozone nonattainment in some areas at some times. Hundreds of such compounds are emitted into the air, primarily by vegetation and motor vehicles, but also by various other evaporative sources, including thousands of commercial processes and consumer products. To be an ozone precursor, even in Los Angeles, an organic compound must be sufficiently volatile to rise into the ambient air and also sufficiently reactive to chemically react there with NO_x to contribute to excessive ozone concentrations. Some emissions of some organic compounds contribute negligibly or not at all to, or even reduce, ozone pollution. *Id.* at 153-54, 170.

6a-8 The predominant organic compounds in water-borne architectural coatings are a class of resins and additives (co-solvents) which include ethylene glycol and propylene glycol. The best scientific evidence is that these glycol compounds are low in volatility. Harley et al., "Respeciation of Organic Gas Emissions," *Environ. Sci. Technol.* (1992) 2395 at 2400. Indeed, as you know, as used in some products, glycol compounds are deemed by EPA and ARB to be insufficiently volatile to be problematic. For example, ARB's consumer product regulations exempt organic compounds with vapor pressures less than 0.1 mm Hg at 20° C. EPA's national consumer product regulation also exempts organic compounds with such low vapor pressures. Our clients believe that it is probable that the glycol compounds in water-borne coatings are similarly non-problematic.

6a-9 The predominant organic compounds in solvent-borne architectural coatings are a class of petroleum distillate carriers referred to as mineral spirits. The best scientific evidence is that mineral spirit compounds are low in reactivity. Harley at 2401. Congress has mandated, 42 U.S.C. § 7511b(e), and ARB and South Coast AQMD have often recognized, as you know, that organic compound regulations must take relative reactivity into account. ARB's low emission vehicle regulations implement such a strategy with the use of reactivity adjustment factors. Our clients deem it very likely that the mineral spirit compounds in solvent-borne coating are similarly non-problematic insofar as ozone pollution is concerned.

6a-10 EPA, ARB, and South Coast AQMD have never shown that the organic compounds in paints contribute materially or at all to ozone nonattainment.[3] California Paint Alliance and ALARM Caucus, based on the best scientific evidence and hypotheses, assert that **paints do not pollute**. In short, outlawing architectural coatings does not help one Californian breathe one easier breath. Please think about this basic point as you consider whether or not to outlaw virtually all paint products and, thereby, to destroy a major California industry.

B. HISTORY OF PAINT REGULATION

6a-11 Notwithstanding the absence of a solid scientific foundation, for 22 years EPA, ARB, and South Coast AQMD have led a very determined effort to regulate architectural coatings formulas in the name of clean air. Certain aspects of the effort have constituted what amounts to nothing short of a brutal war on paint manufacturers, dealers, and contractors, their employees, and the paint-consuming public.

6a-12 Given the extreme and radical nature of the South Coast AQMD's recent amendments, and your staff's public support thereof and current proposal based thereon, we submit that ARB must become familiar with the history of such regulation at all three levels of government, including the dark spots as well as the bright.

(1) ARB Regulation

ARB has made substantive policy choices for Californians about paint regulation on four major occasions during the past 22 years.[4]

In 1977 ARB took the lead in establishing California's so-called "model rule" on architectural coatings. Unregulated

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6a-10 [3] EPA estimates that organic compound emissions from architectural coatings (even assuming they were both highly volatile and highly reactive) constitute about 1% of such emissions from all sources.

6a-13 [4] State implementation plans containing architectural coatings rules, we understand, have typically been approved and transmitted to EPA by the staff, not the board. The board occasionally considers district plans, containing numerous possible control measures, including some relating to architectural coatings, but rarely the specifics of such measures.

solvent-borne coatings generally exceeded 400 g/L of organic compounds (predominantly mineral spirits), and unregulated water-borne coatings generally fell below 250 g/L of organic compounds (predominantly glycols). The initial model rule would have subjected all coatings to a 250 g/L limit over a period of five years. The basic theory was to outlaw the remaining solvent-borne coatings, thereby forcing makers, sellers, and users to switch to water-borne coatings. This led to litigation under the APA brought by the Ad Hoc Committee of Small California Paint Manufacturers against ARB. Within two years of its adoption, a widespread consensus arose among most regulators and regulated parties alike that ARB's adoption and district implementation of the model rule had been, and would be, an economic and environmental disaster. For example, in 1981 South Coast AQMD effectively repealed the model rule's drastic 250 g/L limit for non-flats.

6a-12 In 1981 ARB, then chaired by Mary Nichols (recently appointed as Secretary of the California Resources Agency), reviewed that limit. Health & Safety Code § 41500(b). After extensive public hearings, ARB established in South Coast AQMD the restrictive, but not unreasonable, limit of 380 g/L for non-flats. *Id.* at § 41504. The principle behind ARB's limit was to remove all excess or unnecessary organic compounds from solvent-borne non-flats without banning the products. Other districts followed ARB's lead, and this has been the non-flat limit in most areas ever since.

In 1984 ARB extensively reviewed the model rule limits for all specialty coatings based on technological assessments by outside experts. These limits were thereupon raised by ARB to the 350-420 g/L range. Again, these reasonable reformulation limits have been widely implemented and enforced at the district level for many years and, we believe, have stood the test of time.

In 1989 ARB revisited the issue and, as in 1977, once again became more venturesome. It adopted, over the vigorous opposition of our clients, the current SCM. The SCM fixed limits which would have effectively banned most formulas used to make solvent-borne paints. The theory of the SCM was, as in 1977, to compel the marketplace to substitute water-borne for solvent-borne coatings. Again, as in 1977, the SCM was a flop. A majority of California districts — San Diego APCD, for example — declined to adopt the SCM. Others were ambivalent, such as

6a-12 Colusa APCD, which adopted the SCM and, then, promptly repealed it. A few districts which did attempt to implement the SCM, were sued, along with ARB, by our manufacturer, contractor, and dealer clients. *Colusa APCD v. Superior Court*, 226 Cal.App.3d 880 (1991). One court invalidated Bay Area AQMD's amendments under CEQA. *Dunn-Edwards Corp. v. Bay Area AQMD*, 9 Cal.App.4th 644 (1992). Ventura APCD's amendments were also invalidated on the same grounds after a second trial before a second judge. Furthermore, most of South Coast AQMD's amendments were invalidated in a third proceeding. *Dunn-Ewdards Corp. v. South Coast AQMD*, 19 Cal.App.4th 519, 522 (1993).

6a-14 In short, ARB's record during the last two decades has been mixed. When it sets limits designed to remove excess compounds from paint products, but not to ban those products, it succeeds. Local districts follow, and industry does not challenge the action. But when ARB has attempted to outlaw coatings (even only solvent-borne coatings) it has failed. Local districts and regulated parties rebel and prevail.

(2) <u>EPA Regulation</u>

6a-15 Initially, EPA regulated architectural coatings indirectly through the states. Sections 110, 172, and 182 of the Clean Air Act, 42 U.S.C. §§ 7410, 7502, 7511, mandate that states in ozone nonattainment areas prepare state implementation plans to be approved by EPA. In particular, Section 182(b)(1)(A)(i) mandates that California shall provide for organic compound emissions reductions by 1996 of 15%. Sections 110(k)(5) and 172(d) provide that EPA shall require states to correct plan deficiencies. Federal courts occasionally order districts to implement federally-approved plans. *E.g., CBE v. Deukmejian*, 731 F.Supp. 1448 (N.D. Cal. 1990); *CBE v. Deukmejian*, 746 F.Supp. 976 (N.D. Cal. 1990); *CBE v. Wilson*, 775 F.Supp. 1291 (N.D. Cal. 1991). However, the CAA does not require any state or local regulator to forego his or her usual quasi-legislative discretion not to adopt, or to repeal, an unwise rule. *Trustees For Alaska v. Fink*, 17 F.3d 1209, 1211-13 (9th Cir. 1994); *Coalition Against Columbus Center v. New York*, 967 F.2d 764, 773-75 (2nd Cir. 1992).[5]

6a-16 [5] If the CAA were treated as a federal mandate "commandeering" local and state regulators, it would violate the Tenth Amendment of the U.S. Constitution. *Printz v. U.S.*, 117 S.Ct. 2365, 2379, 2384 (1997); *Brown v.*

6a-15 More recently, EPA has begun to regulate architectural coatings and other products directly. In 1990 Congress enacted Section 183(e) which authorized EPA to (a) study, (b) list, and (c) regulate, under a highly specific regulatory process, products emitting organic compounds. 42 U.S.C. § 7511b(e). In 1995 (preliminarily) and 1998 (finally) EPA listed architectural coatings for immediate regulation. Section 183(e)(1)(A) and (3)(A) mandate that such regulations shall require "best available controls," or the degree of emissions reduction determined, on the basis of "technological and economic feasibility" and "environmental . . . impacts," is achievable through application of "the most effective" measures.

On September 3, 1996 EPA proposed and on September 11, 1998 it adopted a final national rule on architectural coatings. Again, Ms. Nichols, then as the head of EPA's air program, was in charge of these determinations. EPA's limits are in line with the California consensus, as generally reflected in ARB's 1981 and 1984 actions and virtually all actions of all districts. For example, the limit for nonflat coatings is 380 g/L, the limit for flat coatings is 250 g/L, the limit for industrial maintenance coatings is 450 g/L and the limit for primers is 350 g/L. 6a-17 The theory behind EPA's rule was to extend regulation to water-borne, as well as solvent-borne, coatings, but to remove excess compounds through reformulation only, not to ban any products and force substitution of low- or no- OC paints on non-paint substrate protection products.

(3) <u>South Coast AQMD and Other District Regulations</u>

6a-18 Some California air districts have never regulated architectural coatings. Others have done so infrequently and moderately. As discussed above, only a few have attempted to embrace ARB's 1989 SCM.

Even South Coast AQMD, itself, has generally acted reasonably. It has amended its paint rule 22 times in 22 years. With several exceptions, most of those actions were widely seen as fair and sensible, as they aimed at removing unnecessary organic compounds from paints, not banning products.

6a-16 *EPA*, 521 F.2d 827 (9th Cir. 1975), vacated and remanded *EPA v. Brown*, 431 U.S. 99, 103 (1977), on remand *Brown v. EPA*, 566 F.2d 665 (9th Cir. 1977).

6a-19 South Coast AQMD, however, has recently gone off the deep end. It has in 1996 and 1999 adopted limits, not to remove excess compounds, nor even to ban only solvent-borne coatings, but to ban virtually all architectural coatings, water-borne included.[6] Its rule amendments will in the early part of the next decade, by imposing limits as low as 100 g/L, outlaw all solvent-borne paints and the best water-borne paints. They will later in the decade, by imposing limits as low as 50 g/L, ban virtually all the rest of the coatings used today.

6a-21 This is not the time or place to detail the sorry performance of the South Coast AQMD staff, certain outside interest groups, or the decision-making process of the South Coast AQMD board majority. Suffice it to say that our clients contend that the 1996 and 1999 actions were not taken on the merits. South Coast AQMD has made a grave mistake which, we believe, **will not stand**.

6a-22 These draconian actions were taken without widespread public support. The 1999 South Coast AQMD amendments were critiqued extensively by local and national news media. For example, the *Los Angeles Daily News* editorialized that its new rules were "radical" and "drastic." The *Long Beach Press—Telegram* opined that South Coast AQMD regulators are "leaning toward make-believe when it comes to paints" and trading "an all but impossible price to pay" for "improvements in air quality [which] could be next to nothing."

6a-20 [6] These bans cannot be excused on the basis of the widely-held (but highly dubious) theory of "technology-forcing." *See, e.g.*, *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 623, 629, 634, 636, 641, 642, 649, 650 (D.C. Cir. 1973) (use by clean air regulators of technology-forcing theory is "drastic medicine," a "dangerous game of economic roulette," and "shock treatment," and rulemakers, therefore, must avoid "crystal ball" gazing or "prophecy" at the time of adoption and, if necessary, allow an "escape hatch" or "safety valve" at the time of effectiveness). Here, low-OC and no-OC products have been manufactured and marketed by most companies as low-odor products (and by a few national companies more aggressively) for a number of years, and two-component systems with low-OC or no-OC have also been used in industrial settings for many years. However, virtually no professional nor do-it-yourself painters freely elect to buy and use these either unsuitable or expensive and difficult-to-use products. In short, these new limits do not force the development of new technology; instead, they force the use of existing, but wholly inadequate, technology.

6a-22 The *Daily News* conducted this poll: "Do you favor tougher standards for the paint industry?" There were about 500 responses, 94% of which were "no." The *Orange County Register* asked its readers this question: "Do you think new paint formula regulations will force smaller manufacturers out of business?" Of 184 responses, 91% answered "yes."

The board member who spearheaded the 1996 ban of flats gave this pathetic rationale in his summation: ". . . [W]e're at a serious turning point in the history of this District and in our effectiveness as an organization. If we can't pass this we are, in effect, saying that we are failing in our ability to move forward."

Another board member, an elected official whose constituency is larger that those of all other elected official board members combined, voted "no" in 1996 and again in 1999. He cited the amendments' massive costs and nominal benefits, stating in 1996 that his colleagues were taking "a step backward," as well as "a sharp turn to the left."

6a-23 Whether South Coast AQMD's recent steps are forward or backward, right or left, one thing is certain: its steps are huge and unlike any others taken before. South Coast AQMD is now alone, isolated from the mainstream, and, we perceive, the object of widespread and growing public ridicule. Unfortunately, ARB's staff has now stepped out into the same untenable and exposed position.

II. <u>OUR CLIENTS' FOUR MAIN POINTS</u>

A. THE NEW NEED TO ABSTAIN

(1) <u>Policy Reasons</u>

6a-24 For 22 years EPA, ARB, and South Coast AQMD have "triple-teamed" paint manufacturers, dealers, and contractors, their workers, and the paint-using public. Now, due to federal action last year, there is absolutely no reason why this wasteful and unfair triplication should continue.

Even if paints pollute, which we deny, it is unconscionable that more than one level of government should continue to regulate. All three agencies are powerful, well-financed, and aggressive. Any one of the three has certainly proven itself ready, willing, and able to handle the task. The assaults by the other two, at this point, are wholly gratuitous.

Accordingly, at least two of the three levels of government currently regulating architectural coatings should immediately stop doing so. Taxpayers will thereby save two totally wasteful sets of regulatory costs. More significant, the public will save the even larger costs inherent in complying with, not one, but three, sets of rules — which usually conflict.

6a-24 ARB is the most obvious candidate of the three to abstain. EPA is the only agency with explicit rulemaking authority over architectural coatings, 42 U.S.C. § 7511b(e), and it has now definitively exercised that authority. Districts also claim the power to regulate all "sources" of "air pollution".[7] On the other hand, the Legislature has explicitly denied ARB authority to regulate architectural coatings. Health and Safety Code § 41712.

In short, the fact the ARB has been involved in the regulation of architectural coatings in the past has been an anomaly, and now it is also an anachronism. ARB should gracefully retire from the field.

Of course, rulemaking at the district level is "[s]ubject to the powers and duties" of ARB. Health and Safety Code § 40001(a); *People v. A-1 Roofing Service, Inc.*, 87 Cal. App. 3d Supp. 1, 10 (1978). To coordinate district activity and ensure compliance with state standards, ARB shall review district rules to determine whether they are sufficiently effective to achieve and maintain such standards. Health and Safety Code § 41500(b). If ARB finds that district rules will not likely do so, it may establish for a district rules it deems necessary to do so. *Id.* at § 41504(a). This statutory scheme empowers ARB to "oversee" the effectiveness of district regulations with "ultimate authority" to establish them. *Stauffer Chemical Co. v. ARB*, 128 Cal. App. 3d 789, 793 (1992). Furthermore, ARB is authorized to "coordinate" district efforts. Health and Safety Code §§ 39003, 39500. It may also provide "assistance" to any district. *Id.* at § 39605(a). Finally, ARB has the 6a-25

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[7] *Cf.*, *WOGA v. Orange County APCD*, 14 Cal.3d 411, 417 (1975) (districts lack statutory authority to regulate contents of fuel in motor vehicles).

6a-25 responsibility to conduct "research" into the causes of and solution to air pollution.

6a-26 After 22 years of painful experience in the field of architectural coatings regulation, it is doubtful whether districts any longer need ARB's assistance, and whether there is any longer a need for ARB to exercise its oversight powers by adopting model rules. If any ARB oversight actions are deemed appropriate, they would best be limited to two types. First, ARB could coordinate district efforts to harmonize California rules with the EPA rule. Second, ARB could research the volatility of glycols and the reactivity of mineral spirits to determine whether any paints and, if so, which ones are the proper targets of clean air regulation.

(2) Federal Inconsistency

6a-27 Indeed, continued ARB involvement in this issue is now problematic on legal as well as policy grounds. Because EPA has now adopted nationwide limits on paint contents, state law prohibits inconsistent ARB standard-setting.

ARB is required under the APA to prepare and publish an initial statement of reasons describing its efforts to avoid "conflicts with federal regulations . . . addressing the same issues." Government Code § 11346.2(b)(6). It is also bound to include in a notice of rulemaking an informative digest containing a concise and clear summary of "existing laws and regulations . . . related directly to the proposed action" and, if the action "differs substantially from an existing comparable federal regulation or statute," the digest shall include a "description of the significant differences." *Id.* at § 11346.5(a)(3). An ARB regulation is approveable only if it complies with the standard of "[c]onsistency." *Id.* at § 11349.1(a). That means it must be "in harmony with, and not in conflict with or contradictory to," existing law. *Id.* at § 11349(d). These provisions ensure that ARB's regulations are consistent with CAA Section 183(e) and EPA's national paint rule thereunder. *Engelmann v. State Board of Education*, 2 Cal.App.4th 47, 62 (1991).[8]

6a-28 [8] Proposal and any adoption of the draft proposed SCM are subject to APA. The APA is applicable to the exercise of "any quasi-legislative power" conferred upon a state agency by statute. Government Code § 11346. "No state

6a-27 Where, as in the matter now before you, a state law on a particular subject forbids what a federal law on the same subject permits, the two are inconsistent. *California v. FERC*, 495 U.S. 490 (1990) (state law imposing 30-60 cfs minimum on dam operator conflicts with federal law permitting 11-15 cfs minimum); *National Broiler Council v. Voss*, 44 F.3d 740, 747 (9th Cir. 1994) (state law imposing poultry label standards inconsistent with federal law); *California v. FCC*, 39 F.3d 919, 933 (9th Cir. 1994) (state's more stringent requirements on telephone company internet services conflict with more permissive federal law); *Vietnamese Fishermen v. California Department of Fish & Game*, 816 F.Supp. 1468, 1474-5 (N.D. Cal. 1993) (state prohibition of gill nets below 38° north latitude inconsistent with federal rule allowing such use); *Southern Fisheries Assn. v. Martinez*, 772 F.Supp. 1263, 1267-68 (S.D. Fla. 1991) (state law restricting fishermen to 2.99 million pounds per year in conflict

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6a-28 agency shall issue, utilize, enforce, or attempt to enforce any . . . standard of general application . . . which is a regulation as defined in subdivision (g) of Section 11342, unless the standard of general application . . . has been adopted as a regulation . . . pursuant to this chapter." *Id.* at § 11340.5. Section 11342(g) defines a regulation as follows: "Regulation means every . . . standard of general application . . . adopted by any state agency to implement the law enforced or administered by it . . ." *Id.* at § 11342(g). The definition is interpreted broadly. *Tidewater Marino Western v. Bradshaw*, 14 Cal.4th 557, 569-71 (1996). In particular, ARB shall adopt standards and regulations in accordance with the provisions of the APA. Health & Safety Code § 39601(a). ARB normally follows the APA in carrying out its quasi-legislative activities. *E.g.*, *Western Oil & Gas Assn, v. ARB*, 37 C.3d 502, 524-29 (1984) (ARB adoption of state air quality standards); *Western States Petroleum Assn. v. Superior Court*, 9 C.4th 559, 565 (1995) (ARB adoption of vehicular source regulation); *Clean Air Constituency v. ARB*, 11 C.3d 801, 815-16, 818-19 (1974) (ARB postponement of effective dates of previously adopted vehicular source regulations); *Stauffer Chemical*, 128 C.A. 3d at 793 n.4, 794, 796 n.5 (ARB review of district rule and establishment of stricter district rule). Where, as here, a state agency adopts standards to be followed by local or other state agencies, their proposal and adoption are subject to APA. *Engelmann*, 2 Cal.App.4th at 55-56; *San Marcos v. California Highway Comm.*, 60 Cal.App.3d 383, 403-10 (1976); *Ligon v. State Personnel Board*, 123 Cal.App.3rd 583, 587, 588 (1981); *Armistead v. State Personnel Board*, 22 Cal. 3d. 198, 202-04 (1978). The Office of Administrative Law has determined that a model law adopted by a state environmental agency for consideration and potential adoption by local environmental agencies is, itself, a regulation subject to APA. *In re Ventura County*, 199 OAL Determination No. 19 at 608 (the definition of regulation "does not require that [general] applicability of the challenged rule stem from the adopting agency").

with federal law allowing up to 3.14 million pounds). Significantly, this type of inconsistency has been found in a similar case in the clean air context. In *American Motors Corp. v. Blum*, 603 F.2d 978, 981 (D.C. Cir. 1979) the court compared a California air pollution control regulation with a corresponding federal regulation under the CAA,, saying:

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> ". . . Congress . . . mandates that with respect to small manufacturers a lead period of two years is necessary . . . We conclude . . . that the California regulation, which denies to AMC a lead time of two years, is inconsistent with [the CAA]."

Thus, under state law, ARB may not adopt nor enforce SCM provisions more restrictive than the EPA regulation adopted on September 11, 1998.

(3) Federal Preemption

Furthermore, any SCM provisions more strict than federal law are also now unconstitutional. Article VI, Clause 2 of the U.S. Constitution provides that ". . . the laws of the United States . . . shall be the supreme law of the land." Under this clause, state laws which interfere with federal laws on the same subject are invalid. *See, generally, McCulloch v. Maryland*, 4 Wheat 316 (1819); *Gibbons v. Ogden*, 9 Wheat. 1, 211 (1824); *Cooley v. Board of Wardens*, 12 How. 299, 319 (1851). Two lines of implied preemption cases are especially pertinent to the matter at hand.

6a-29 First, where a state law on a particular subject forbids what a federal law on the same subject permits, the two are in conflict, as discussed above, and the state law is, therefore, unconstitutional. *American Motors*, 603 F.2d at 981; *FERC*, 495 U.S. at 490; *National Broiler*, 44 F.3d at 747; *FCC*, 39 F.3d at 933; *Vietnamese Fishermen*, 816 F.Supp. at 1474-5; *Southern Fisheries*, 772 F.Supp. at 1267-68.

Here, it is clear that each of the proposed limits (among other provisions) would prohibit manufacture, sale, and use of coatings which the corresponding EPA provision permits. Therefore, each would be conflicting and, for that reason, invalid under the Supremacy Clause.

Under a second line of implied preemption cases, where Congress intends to establish uniform standards governing products which move in interstate commerce, state laws frustrating such national uniformity are preempted. *Ray v. ARCO*, 435 U.S. 151, 166 (1978) (oil tanker design); *International Assn. of Independent Tanker Owners v. Locke*, 148 F.3d 1053 (9th Cir. 1998) (same); *Independent Energy Procedures v. California PUC*, 36 F.3d 848, 854 (9th Cir. 1994) (co-generation facilities).

A district court in California and the Ninth Circuit have explicated the above principles in the context of regulating mobile goods to reduce air pollution. In *California v. Navy*, 431 F.Supp. 1271 (N.D. Cal. 1977) ARB and a California air district sued the U.S. Navy alleging violation of California rules regulating pollution emitted from the immobile concrete structures in which moveable jet engines were tested. The court held that the structures could be regulated, but not the engines. The court explained that the general scheme of the CAA is that EPA regulates "moving" sources, but states retain residual authority over "stationary" sources. *Id.* at 1275. It noted the need for national "uniformity" for moveable products. *Id.* at 1284, 1288 n. 14. It stated that CAA preemption protects engine
6a-29 manufacturers "against the 'chaos' of multiplex standards for entities which readily traverse state lines." *Id.* at 1285. The court found that the federal interest was to protect against varying state regulation of the "performance, design, manufacture, operation, etc." of moving products. *Id.* at 1285, 1287. On appeal, *California v. Navy*, 624 F.2d 885 (9th Cir. 1980), the Ninth Circuit agreed, finding that the district court had "extensively and excellently" analyzed implied preemption principles in the context of air pollution regulation of moveable goods. *Id.* at 888, 889. It stated that a purpose of federal preemption of aircraft engine regulation was national "uniformity" of standards. *Id.* at 889. It stated that "federal interests . . . would be impaired" if the engines, themselves, "must be altered to accommodate state law." *Id.* at 889.

California v. Navy was followed by a California appellate court in a state air pollution case. *Harbor Fumigation, Inc. v. San Diego APCD,* 43 Cal.App.4th 854, 867 (1996) (district regulation of methyl bromide as a pesticide would be preempted).

In the matter now before ARB, it is clear that Congress intended to promote national uniformity of standards governing mobile products by enacting CAA Section 183(e). The legislative history so demonstrates. The Report of the House Committee on Energy and Commerce specifically expressed concern about "the potential burden which different States['] standards might impose on manufacturers of products sold nationwide." H.R. Rep. No. 101-490 (May 17, 1990) at 254. Section 183(e)(9) was intended to encourage cooperation in "developing uniform regulation" of such products. *Id.* "Where national regulation and uniformity is necessary, the legislation so indicates." *Id.* at 163. Products ". . . can be more effectively controlled at a national level . . ." *Id.* at 248. Indeed, the House Report specifically contemplated that architectural coatings ". . . will be covered by a national rule . . ." *Id.* at 251. The statement of the Senate managers similarly noted that Section 183(e)(9) is intended to "encourage national uniformity."

Furthermore, EPA's own statement supporting its promulgation of a national regulation of architectural coatings provides further support for this proposition: 6a-29

> "A Federal rule is expected to provide some degree of consistency, predictability, and administrative ease for the industry . . . [A] national rule helps reduce compliance problems associated with noncompliant coatings being transported into nonattainment areas from neighboring areas and neighboring States . . ." 61 Fed.Reg. at 32731.[9]

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[9] Section 183(e)(a) alludes to, but does not explicitly authorize, state regulations of products. This may allow states to regulate the intrastate use of paint. But it does not negate preemption of the regulation of interstate manufacture and sale thereof. *Wisconsin Public Intervener v. Martier*, 501 U.S. 597, 613-14, 615 (1991); *Washington State Building and Construction Trades Council v. Spellman*, 684 F. 2d 627, 630 (9th Cir. 1982); *Casper v. E.I. Dupoint de Nemouns & Co.*, 806 F. Supp. 903, 905-07 (E.D. Wash. 1992). In addition, certain general provisions of the CAA, which were originally enacted in 1970, state that air pollution control at its source is the primary responsibility of the states and that nothing in the CAA precludes the right of any state to adopt any standard, limit, or requirement respecting control of air pollution. 42 U.S.C. §§ 7401(a)(3); 7416. However, such ancient and general provisions do not prevent preemption. *FERC*, 495 U.S. at 496-507; *Independent Energy Producers*, 36 F.3d at 857 n.14. The U.S. Supreme Court was unable to find in a similar CAA provision "any clear and unambiguous declaration" of residual state power. *Hancock v. Train*, 426 U.S. 167, 180-81 (1976). Indeed, the court was "not able to draw . . . any support" from Section 116, itself, for the state's argument against preemption. *Id.* at 186

6a-29 Thus, the federal mandate that mobile products, including paints, be regulated uniformly on a national basis impliedly preempts all state and local limits, including the proposed SCM amendments, which frustrate the federal limits.

B. REASONABLE CONSENSUS LIMITS

6a-30 If, for some reason, ARB determines that it will stay in the paint game, despite EPA's 1998 rulemaking, it should follow the example of EPA (and most districts, as well as its own examples in 1981 and 1984) and adopt limits which are reasonable, that is, which remove unnecessary organic compounds, but do not actually ban socially valuable paint products.

EPA's 1998 national rule adopted limits which most California manufacturers have found reasonable. These limits require reformulation to remove excess organic compounds for both solvent-borne and water-borne coatings, but they generally do not outlaw product lines. They are now operative in all states, including California.

6a-31 All knowledgeable and candid observers acknowledge that paint bans have massive economic costs. They also acknowledge that any ozone reduction benefits of paint bans are dubious at best, due to low volatility of glycol compounds in water-borne coatings, low reactivity of mineral spirit compounds in solvent-borne coatings, and increased paint usage of low-quality coatings (and, therefore, increased emissions). *Dunn-Edwards v. Bay Area AQMD*, 9 Cal.App.4th at 657-58. Indeed, paint bans will produce still other adverse environmental impacts (aesthetic, health, safety) in either a badly-painted or an unpainted California. Given these facts, precipitous action of the type your staff proposes is wholly unwarranted.

6a-32 Most California air districts, on almost all occasions they have addressed the issue, have regulated architectural coatings — if they have done so at all — by imposing limits and deadlines which required reformulation to remove excess organic compounds, but they did not cross the line and ban products to force substitution of low-quality paints or non-paint products. The consensus at the local level has been so strong that ARB's

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6a-29 n.47. Section 116 is not "the kind of clear and unambiguous authorization necessary" to avoid preemption. *Id.*

6a-32 1989 SCM, which attempted to outlaw certain solvent-borne coatings, has had no real effect in most local areas.

ARB, itself, has on key occasions honored this consensus of reason. In 1981, ARB established the 380 g/L limit for non-flats in South Coast AQMD, after which the entire state followed. In 1984, ARB amended its model rule to raise limits for specialty coatings and, again, all districts did the same.

6a-33 Finally, on September 11, 1998, after years of reporting and scheduling activity purporting to comply with the detailed study and listing mandates and the stringent, but sensible, rulemaking standard of CAA Section 183(e), EPA promulgated limits applicable in every state of the union, including California. These limits, too, force California manufactures to remove excess compounds from all their products. But they do not force them to stop making, or their customers to stop using, such products.

6a-34 If ARB believes (we contend erroneously) that it must continue to act, then it should, indeed, "harmonize" the SCM with the new EPA rule and also with the vast majority of all district rules, as well its own rulemaking actions of 1981 and 1984. The regulatory consensus was at least reasonable and is the only defensible type of continued activity.

C. SOUTH COAST AQMD MISTAKE

6a-35 In stark contrast, South Coast AQMD's recent actions are no example for ARB or any other agency to follow.

To any astute observer, it was obvious that the South Coast AQMD staff members who recommended the new amendments, the interest groups which supported them, and the South Coast AQMD board members who voted for them, did not act on the basis of the environmental and economic merits, but on the basis of extraneous factors. These radical and extreme actions were driven not by reason but by power and emotion.

What will be the consequences of South Coast AQMD's irresponsible actions? Of course, no one can predict the future with any certainty. But here is our best speculation at this time: South Coast AQMD's recent proposal mobilized public opposition as never before, and its adoption will surely intensify that mobilization. The fight against unreasonable rules during the past 22 years has been led primarily by a few Southern California paint manufacturers. South Coast AQMD's actions are sure to motivate manufacturers across the nation to become much more actively involved in the crusade. Indeed, large multi-national manufacturers which have in the past not opposed, or even supported, regulation may well join the fight. Contractors and dealers, most of which have to this point been only moderately active, are expected to come forward in the thousands. The same is true of the hundreds of thousands of workers who make, sell, or apply paint for a living. Finally, architects, decorators, and industrial, commercial, and residential users of paint products, who are outraged at the senseless bans, we predict, will become active in a new nationwide campaign to reverse them.

How will that new and indignant force of opposition go about attempting to reverse the product bans? Again, please allow us to risk some predictions: Heretofore, Southern California manufacturers have relied primarily upon courteous
6a-35 presentations to regulators of the scientific and economic merits and on occasional law suits to prevent or invalidate rule adoptions. These basic methods of social action will continue. But, in addition, regulators in the future should expect to encounter new responses. Any future litigation will have to consider seeking monetary relief in addition to rule invalidation.[10] Manufacturers, dealers, contractors, workers, and consumers can also be expected to take their just grievances to the Legislature and the Congress. The issue could also well become a major subject of press attention and, indeed, a prime example of regulatory failure in the mind of the public. For

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[10] For example, trade secrets, including product formulas, are protected property interests. *Formulabs, Inc. v. Hartly Pen Co.*, 275 F.2d 52, 56 (9th Cir. 1960); *Clark v. Bunker*, 453 F.2d 1006, 1009 (9th Cir. 1972); *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 474-75 (1974); *Pachmayr Gun Works, Inc. v. Olin Mathieson Chemical Corp.*, 502 F.2d 802, 807 (9th Cir. 1974). A taking by the government of intangible property for public use requires the payment of just compensation. *Oakland v. Oakland Raiders*, 32 C.3d 60, 66-69 (1982). This principle embraces trade secrets, such as chemical product formulas. *ITT Telecom Products Corp. v. Dooley*, 214 C.A.3d 307, 318 (1989); *Anchem Products, Inc. v. Costle*, 481 F.Supp 195, 199 (S.D.N.Y. 1979); *Ruckelshaus v. Monsanto Co.*, 467 U.S. 986, 1000-14 (1984). Paint manufacturers use thousands of formulas to make and sell their products in California. The amendments in question will render useless and valueless and, thereby, "take" those formulas overnight. The fair market value of the formulas in question is about $400 million.

6a-35 example, imagine millions of paint cans and pails on retail shelves and delivery trucks and at job sites bearing stickers crying "Save Paint" and thousands of signs in paint stores, home centers, lumber yards, and hardware stores bearing the same message. Imagine also millions of shoppers and homeowners being handed brochures telling the story of what paints have been outlawed, by whom, for what reason, and with what effect. In short, holding appointed and elected officials accountable for unjust and irrational regulatory actions will likely be the new paradigm.

D. ARB STUDY DUTIES

6a-36 Before taking any form of quasi-legislative action, ARB must first analyze the environmental and economic effects of the major alternative approaches. This the staff did not do, but the board must insist that it do, before any further public statements.

(1) <u>Environmental Impacts</u>

6a-37 ARB is bound under CEQA to submit written documentation, containing environmental information, as to any project which may have a significant effect on the environment. Pub. Res. Code § 21080.5(a). Such documentation is required to include a description of the proposed activity with alternatives thereto and measures to minimize any significant adverse environmental impact thereof. *Id.* at § 21080.5(d)(3)(i); 14 Cal. Code Regs. § 15252. Under Section 21080.5 an agency must prepare documentation which is the "functional equivalent" of a full environmental impact report. *City of Coronado v. California Coastal Zone Conservation Commission*, 69 C.A.3d 570, 581 (1977); *Gallegos v. State Board of Forestry*, 76 C.A.3d 945, 953 (1978). Indeed, the information required in such a document is "essentially duplicative" of that which would be included in a full EIR. *Citizens For Non-Toxic Pest Control v. Department of Food & Agriculture*, 187 C.A.3d 1575, 1584 (1986). An agency subject to Section 21080.5 must adhere to CEQA's "substantive criteria" and "broad policy goals." *Environmental Protection Information Center, Inc. v. Johnson*, 170 C.A.3d 604, 618, 620 (1985). ARB is "responsible" for complying with CEQA, has to "meet its own responsibilities," and "shall not rely" on other

6a-37 agencies. 14 Cal. Code Regs. § 15020; *Dunn-Edwards v. Bay Area AQMD*, 9 Cal.App.4th at 656.[11]

6a-38 Prior to offering "support" for South Coast AQMD's amendments and floating the draft proposed SCM, ARB's staff failed to prepare an EIR-equivalent analyzing the following adverse environmental impacts of the proposed amendments: (1) aesthetic impacts of first and second set of limits, (2) health and safety impacts thereof, (3) increased volatility of emissions after first set, (4) increased reactivity thereof thereafter, (5) increased emissions thereafter, and (6) adverse ozone impacts of substitutes for paint products. Alternatives must also be assessed. These adverse environmental impacts and alternatives are discussed extensively in our April 21, 1999 letter to SCAQMD. A copy of this letter will be sent to you under separate cover.

ARB's staff took a shot in the dark by taking extremely important, and harmful, regulatory positions in public before analyzing the adverse environmental effects of those positions. At the June 3 workshop, ARB's staff promised to prepare a draft EIR-equivalent by the end of June. Unfortunately, that will come two months after the staff's damaging actions.

6a-37 [11] The term "project" is broadly defined in CEQA Section 21065(a), as follows: "[Project] means an activity which may cause . . . a reasonably foreseeable indirect physical change in the environment, and which is . . . [a]n activity directly undertaken by any public agency. . . ." Pub. Res. Code § 21065(a); see also 14 Cal. Code Regs. § 15378(a). The term "project," as used in CEQA, is given a "broad" interpretation by the courts. *Friends of Mammoth v. Board of Supervisors*, 8 C.3d 247, 259-62 (1972). Indeed, such broad interpretation is "[t]he foremost principle under CEQA." *Laurel Heights Improvement Assn. v. Regents*, 47 C.3d 376, 390-91 (1988). The projects to which the mandate of CEQA Section 21080.5 applies involve the "adoption or approval of standards . . . or plans for use in the regulatory program." Pub. Res. Code § 21080.5(b)(2). ARB's program has been so certified to involve "the adoption, approval, amendment or repeal of standards . . . or plans to be used in the regulatory program." 14 Cal. Code Regs. § 15251(d). The first of several governmental approvals of a project requires CEQA compliance. *Citizens Assn. For Sensible Development of Bishop Area v. County of Inyo*, 172 C.A.3d 151, 164-68 (1985). The first step of a multi-step project must be the subject of appropriate environmental review under CEQA. *City of Carmel-By-The-Sea v. Board of Supervisors*, 183 C.A.3d 229, 240-49 (1986). Environmental review documentation meeting CEQA requirements must be prepared at the earliest possible stage. *Id.* at 249-52.

6a-39 We note that on June 11, 1999 ARB published an initial study and a notice of preparation of an EIR-equivalent. It appears that ARB does not intend to address certain impacts, including (1), (2), and (6) above, nor certain alternatives, including manufacturer disclosures.

(2) Economic Impacts

The APA requires that any state agency think very carefully and in specific ways about the economic and other effects of a proposed quasi-legislative standard before adopting it. In particular, the agency shall assess whether and to what extent the proposed standard will affect the elimination of existing businesses or jobs within California. Government Code §§ 11346.3(b); 11346.54. It shall also assess the potential for adverse economic impact on California business enterprises and individuals, avoiding the imposition of unnecessary or unreasonable regulations. *Id.* at § 11346.3(a). Agency action shall be based on adequate information concerning the need for, and consequences of, the action. *Id.* at § 11346.3(a)(1). The agency shall consider the impact on business, including the ability of California business to compete with out-of-state business. *Id.* at § 11346.3(a)(2).

6a-40 To ensure that such assessments and considerations are performed, an agency shall prepare, submit to the Office of Administrative Law, and make available to the public an initial statement of reasons for proposing the adoption or amendment of a regulation. *Id.* at § 11346.2(b). The initial statement shall include: (1) a description of the problem, requirement, condition, or circumstance the regulation is intended to address; (2) a statement of the specific purpose thereof, the rationale for determining that it is reasonably necessary, and the reasons why any prescriptive standards are required;[12] (3) an identification of each study or report upon which the agency relies; (4) a description of any alternatives considered, including performance standards and alternatives that would lessen the adverse impact on small business, and the reasons for

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[12] A prescriptive standard is a regulation that specifies the sole means of compliance with a performance standard by specific actions, measurements, or other quantifiable means. *Id.* at § 11342(f). A performance standard, on the other hand, is one that describes an objective with the criteria stated for achieving the objective. *Id.* at § 11342(d).

rejecting them;[13] and (5) evidence relied upon to support a finding that the action will not have a significant adverse economic impact on business.

Furthermore, the public notice mandated by APA shall include various information, including an informative digest containing a concise and clear summary of the effect of the proposed action. *Id.* at § 11346.5(a)(3). If the proposed action affects small business, it shall also include a policy statement overview explaining the objectives. *Id.* at § 11346.5(a)(3)(B). An agency shall determine whether the action may have a significant adverse economic impact on business. *Id.* at §§ 11346.5(a)(7), (8). If it may, the notice shall so state, identify types of businesses affected, and solicit proposals for alternatives, including exemptions, differing timetables, and performance standards, that would lessen the impact. *Id.* at § 11346.5(a)(7). If not, it shall so declare and provide evidence to support the declaration. *Id.* at § 11346.5(a)(8). The notice shall also include a statement of potential cost impact, *i.e.*, the reasonable range of costs, or a description of the type and extent of direct or indirect costs. *Id.* at § 11346.5(a)(9). It shall further include a statement as to any significant effect on housing costs. *Id.* at § 11346.5(a)(11). Finally, the notice shall include a statement that the agency must determine that no alternative considered would be more effective or as effective and less burdensome. *Id.* at § 11346.5(a)(12). 6a-40

Upon adoption of a regulation, an agency shall prepare and submit to OAL a final statement of reasons. *Id.* at § 11346.9(a). The final statement shall update the information in the initial statement. *Id.* at § 11346.9(a)(1),(b). It shall include a determination, with supporting information, that no alternative would be more effective or as effective and less burdensome. *Id.* at § 11346.9(a)(4). It shall also include an explanation setting forth the reasons for rejecting any proposed alternatives that would lessen the adverse economic impact on small business. *Id.* at § 11346.9(a)(5).

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[13] A small business is one which is independently owned and operated and not dominant in its field of operation. *Id.* at § 11342(h)(1). The term does not include a manufacturer with more than 250 employees, a contractor with more the $5,000,000 in annual gross receipts, or a retail dealer with more than $2,000,000 in such receipts. *Id.* at § 11342(h)(2)(I)(iii), (iv), (J).

6a-40 OAL shall review regulations and make certain determinations. *Id.* at §§ 11349; 11349.1(a). It shall approve the regulation if it complies with APA. *Id.* at § 11349.1(a). OAL shall return any regulation failing to comply with certain provisions of APA. *Id.* at §§ 11349.1(d), (f); 11349.3.

6a-41 Again, ARB's staff has supported, and proposed, draconian regulation without having performed any of these economic analyses, including: (1) manufacturers' formulas taken, (2) costs of successful reformulation, (3) costs of unsuccessful efforts to reformulate, (4) costs to retailers, (5) costs to contractors, (6) effects on small business (7) anti-competitive impacts, (8) job losses, and (9) losses suffered by consumers. The staff has also failed to identify alternatives (such as directions for use, seasonal use restrictions, and harmonization with EPA's rule) and analyze the various alternatives for cost-effectiveness. A comprehensive discussion of these economic impacts is contained in our May 7, 1999 letter to SCAQMD. A copy of the letter will be sent to you under separate cover.

ARB's staff clearly jumped the gun. It has taken an extreme public position — that the California paint industry should do without virtually all of its existing products — without having even thought about the economic consequences of that unprecedented approach. Indeed, the staff indicated at the June 3 workshop that it intended to press forward without performing an economic analysis under APA. The ARB board must correct this serious (and already disastrous) failure at once.

Conclusion

In 1763 Parliament thoughtlessly and arrogantly imposed on the American Colonies the so-called Townshend Duties, under which various products imported from England to America — including **paints** — were subjected to severe burdens. The Colonists were outraged and, even though Parliament repealed the statute in 1765, the short-lived legislation was a major cause of our glorious American Revolution.

6a-42 South Coast AQMD has similarly made a blunder of cosmic proportions. ARB's staff has aided and abetted that blunder and is now proposing that the ARB board follow suit. No.

6a-43 Our clients submit that ARB should get out of the business of triple-teaming the paint industry, now that EPA has

6a-43 taken over. If it insists on staying in the business, ARB should harmonize its SCM with EPA's national rule, most districts rules, and ARB's own 1981 and 1984 actions. ARB should avoid making the grievous mistake made by South Coast AQMD. Finally, ARB must not take any further action without first conducting its own environmental review under CEQA and its own economic review under APA.

Very truly yours,

William M. Smiland/mme

William M. Smiland

WMS/mme

cc: Michael P. Kenny (Duplicate By Fax)
Peter Venturini (Duplicate By Fax)
Dean C. Simeroth (Duplicate By Fax)
Jim Nyarady (Duplicate By Fax)
Robert Jenne (Duplicate By Fax)
Clients

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EMERITUS
ERNEST M. CLARK, JR.

August 17, 1999

Mr. Jim Nyarady
Manager, Strategy Evaluation Section
Stationary Source Division
Air Resource Board
Post Office Box 2815
Sacramento, CA 95812

Re: Draft Environmental Impact
Report for Suggested Control
Measure for Architectural Coatings

Dear Mr. Nyarady:

This firm represents the California Paint Alliance, a leading California paint industry trade association on regulatory matters, the Allied Local and Regional Manufacturers Caucus, a national paint industry trade association concerned with such matters, and various individual paint manufacturers, retail paint dealers and painting contractors who are headquartered or do substantial business in California and this letter is written on their behalf in response to the Notice of Preparation of a Draft Program Environmental Impact Report for ARB's proposed amendments to the architectural coatings Suggested Control Measure ("Notice").

6b-1 As you correctly state in the Background section (at 1-3), volatile organic compounds ("VOC") are not classified as criteria pollutants and no federal or state ambient air quality standards exist for such compounds. Thus, regulation of VOC should be undertaken only if, and to the extent, the VOC to be regulated participate in promoting ozone concentrations in excess of the standards. However, the Notice goes on to state (at 1-3), "In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations." No citations in support of this statement are listed. I request that you provide me with a complete bibliography of any studies, articles, reports or other documents that you contend support this statement about the impacts ambient VOC are "suspected" to cause.

6b-2 In the Alternatives section (at 1-9) the Notice lists seven alternatives that are under consideration for inclusion in the Draft Program EIR. We strongly support the inclusion and comprehensive analysis of each of the listed alternatives. In particular, a regulatory strategy incorporating exemptions for low vapor pressure and negligibly reactive compounds is consistent both with the objective of achieving ozone attainment and similar regulatory programs developed by ARB.

6b-3 The Environmental Checklist (at 2-11) states that the proposed project will have no impact on use of non-renewable resources in a wasteful and inefficient manner. ARB must face the reality that the draconian limits its proposes will drive home and property owners away from the unsatisfactory coatings that remain on the market to non-paint alternatives such as vinyl or aluminum siding for exterior use and wall coverings for interior use. The effect of this switch has the potential to adversely impact use of non-renewable resources.

The Checklist also states (at 2-15) that the project will have no impact on aesthetics. CEQA provides that it is the policy of California to take all actions necessary to provide its people with "enjoyment of aesthetic, . . . scenic, and historic environmental qualities." Pub. Res. Code §21001(b). The environment must be pleasing to the senses and intellect of man, and regulations must provide a decent home and satisfying living environment for every Californian. *Id.* at §§21000(b), (g); 21001(d). Under the CEQA Guidelines, a project is deemed to have a significant effect on the environment if it will have a "substantial, demonstrable negative aesthetic effect." 14 Cal. Code Regs., App. G(b).

6b-4 In *Quail Botanical Gardens Foundation, Inc. v. City of Encinitas*, 29 Cal.App. 4th 1597, 1603-07 (1994) the court set aside the certification of a negative declaration based upon the city's failure to analyze the aesthetic impacts (impaired ocean views) of the project (a residential subdivision). The court found substantial evidence supporting a fair argument of the possibility of such impact. It ruled that Appendix G(b) of the Guidelines established "a rebuttable presumption" that aesthetic impacts are significant. *Id.* at 1604. The court found it "self-evident" that the project would have negative effects on "beauty." *Id.* at 1604, 1606. Any assertions to the contrary by the city were not adequate to support a decision to dispense with environmental analysis of the aesthetic impacts. *Id.* at 1607.

Obviously, banning over 90% of the coatings now available may have significant impacts on the living environment of every Californian.

6b-5 In addition to the omissions noted above, the Checklist fails to adequately address the potential health and safety impacts of the project, as well as increased reactivity and volatility and increased emissions. The radical nature of the proposed project demands that any Draft Program EIR address substantially more impacts than are identified in the Notice.

Yours very truly,

Christopher G. Foster

CGF/cam

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TCA

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June 24, 1999

Note: Confidential information contained in this letter was redacted as requested by Textured Coatings of America, Inc.

Via Facsimile (916) 322-6088 and Federal Express Overnight

Mr. Jim Nyarady, Manager
Strategy Evaluation Section, Stationary Source Division
Air Resources Board
2020 "L" Street – Fourth Floor
Sacramento, CA 95814

Dear Mr. Nyarady:

7-1 I am writing to explain to you why the California Air Resources Board should establish the following coatings as specialty coatings at the recommended VOC limits. In addition, I have included comments as to why mastic textured coatings should remain at 300 grams per liter as the SCAQMD has done.

• concrete protective coatings	400 grams of VOC per liter of coating
• anti-graffiti coatings	600 grams of VOC per liter of coating
• specialty primer coatings	350 grams of VOC per liter of coating
• mastic textured coatings	300 grams of VOC per liter of coating

I understand that you will require information concerning three factors justifying the coatings categories and the recommended limits: 1) technical justification for the coating and why lower VOC coatings are not an adequate substitute; 2) the additional VOC emissions that would be associated with the coatings at the recommended VOC levels; and 3) why the averaging provisions cannot be effectively used to keep these coatings in the market.

CONCRETE PROTECTIVE COATINGS

7-2 **Technical Justification:** We sell a Concrete Protective Coating XL-70® (basic chemistry vinyl toluene acrylic copolymer resin). This chemistry requires a VOC content of 400 grams per liter to achieve the coatings required performance and application characteristics.

The product is a solvent-base vinyl toluene acrylic copolymer system that is designed to go through form oils and release agent materials that are used in the forming of the concrete and remain on the surface of the concrete. Lower VOC products cannot penetrate these materials and provide the required adhesion. This product has been extensively tested over bare concrete. It was designed to meet the GSA Federal specification T.T.C 555 B for cement masonry surfaces.

It is also specified for bare old or new "green" concrete bridges by D.O.T.'s of many states, as well as architects for poured-in-place concrete and tilt-up. In all these cases the choice of textures and the high film built (16 miles dry) permit the product to bridge hair line cracks and diminish surface imperfections.

You will note that the coating uses an acrylic copolymer resin. The acrylic resin coatings chemistry has been identified by staff as presenting opportunities for lower VOC products and this was a consideration in selecting it for this coating. The performance characteristics that require the higher VOC content which cannot be met by lower VOC materials include that it is a primer-less, one coat system which is 15 to 20 times thicker than normal paint to provide protection for periods of over 20 years without requiring recoating and to meet similar strict performance requirements and specifications. 7-2

The prevention of the deterioration of concrete buildings, bridges, and other structures, which are not easily maintained or rebuilt, is the coating's primary purpose. The chemistry, which results in the hardness and long durability of the coating, is a high solids chemistry, which results in a dense coating. Because of its high solids and density and thus enhanced protective qualities, the chief beneficial characteristic of the coating which distinguishes it from other coatings that might otherwise be used, it requires a higher VOC content to perform and to be effectively applied. This coating, when applied, achieves excellent adhesion to the concrete and cures to a hard thick protective coating. Exposed concrete structures, which are increasingly being built in lieu of steel structures, require protection from extreme weather conditions, salt spray, and from water and chloride ion intrusion which can break down the concrete and thereby deteriorate the structure. An example of an extreme weather condition which the coating is designed to protect against is a hail or heavy rain storm, which would breakdown less durable coatings and thereby expose the concrete to salt spray and chloride ion intrusion. While such extreme conditions may be rare, they can be highly destructive of less durable coatings over large areas of concrete surfaces greatly increasing the probability of deterioration of the structure if not repainted. The coating's single coat application, primer-less, and longevity features not only reduce VOC emissions, they also reduce worker safety risks because the total number of man-hours that otherwise would be required to coat and recoat the difficult and often dangerous to paint concrete structures are greatly reduced.

Additional VOC Emissions:
It is expected that as the use of tilt up concrete structures increases in the
7-3 District there will be more demand for the coatings However, these structures will require some type of coating in any event. Use of our coating reduces the repainting that would otherwise occur and thereby reduces VOC emissions over time.

Inability to Use Averaging: We are a specialty high performance coating manufacturer and
7-4 therefore do not manufacture coatings which lend themselves to very low VOC content, e.g., flat interior coatings. We do make every effort to lower the VOC content of our coatings, however,

7-4 as evidenced by our use of acrylic technology for our concrete protective coatings. The averaging provisions can only be effectively used by companies with diverse coating lines and thus penalize a company like Textured Coatings of America which has devoted its efforts to developing niche market coatings that otherwise would not have been developed because the volumes are too small to interest large manufacturers with diverse coating lines. This product represents our entire product line in the industrial maintenance coatings area.

ANTI-GRAFFITI COATINGS

7-5 **Technical Justification:** Our anti-graffiti coatings are solvent borne polyurethane products. The coating provides a permanent as opposed to a temporary anti-graffiti system and the chemistry to accomplish this requires a VOC content of at least 600 grams per liter. It is important to understand why permanent systems are required for anti-graffiti systems. Besides eliminating the need for successive recoatings (the permanent systems can be cleaned of subsequently applied graffiti) the systems also provide the only effective anti-graffiti protection for surfaces that cannot be repainted, such as murals. The clear hard coating of our product can be cleaned and still protect the underlying mural without having to reapply the anti-graffiti product again. In fact, during the last Olympic games held in Los Angeles, it was our anti-graffiti system that was used on the city's murals. Our anti-graffiti system is approved by the city of Los Angeles under their Research Report #25054-T and is identified as Graffiti Gard IIIS.

7-6 **Additional VOC Emissions:**

Use of our coating reduces the repainting that would otherwise occur after each graffiti episode and thereby reduces VOC emissions over time. Moreover, based on the Air Resources Board's Architectural Coatings Survey, it does not appear anti-graffiti coatings represent any substantial emissions. In fact, your survey failed to identify any sales gallons reported.

7-7 **Inability to Use Averaging:** We are a specialty high performance coating manufacturer and therefore do not manufacture coatings which lend themselves to very low VOC content, e.g., flat interior coatings. We do make every effort to lower the VOC content of our coatings. The averaging provisions can only be effectively used by companies with diverse coating lines and thus penalize a company like Textured Coatings of America which has devoted its efforts to developing niche market coatings that otherwise would not have been developed because the volumes are too small to interest large manufacturers with diverse coating lines.

SPECIALTY PRIMERS

7-8 **Technical Justification:** We sell three specialty primers. Our XL-70® Masonry Primer is used primarily to prime poured-in-place concrete and tilt-up concrete (pre-formed concrete that is delivered to the building site and then is "tilted-up" into place, see enclosed photographs). The product is a solvent-base vinyl toluene acrylic copolymer system that is designed to go through form oils and release agent materials that are used in the forming of the concrete and remain on the surface of the concrete.

Lower VOC products (including latex systems) cannot penetrate these materials and provide the required adhesion.

7-8 Our other two major specialty solvent based primers, namely Primer 27 and Primer 62, were specifically designed to go over less than ideal wood surfaces and chalky paint. The higher VOC (350 grams per liter) solvent primers penetrate the chalky surfaces and provide excellent adhesion for subsequent topcoats. Waterborne products cannot do the same, and thus require far more surface preparation. Latex primers are not recommended for cement masonry block, brick and mineral surfaces that have been previously treated with silicone-type water repellents. They require a special solvent-based primer to be used. TCA's primers XL-70®, Primer 27 or Primer 62 are ideal for these surfaces. Other surface types requiring specialty primers with VOC levels of 350 grams per liter are galvanized metal, aluminum, copper, stainless steel, ferrous metal and baked enamels.

Additional VOC Emissions:

7-9 **Inability to Use Averaging:** We are a specialty high performance coating manufacturer and therefore do not manufacture coatings which lend themselves to very low VOC content, e.g., flat interior coatings. We do make every effort to lower the VOC content of our coatings, however, as evidenced by our use of acrylic technology for our concrete protective coatings. The averaging provisions can only be effectively used by companies with diverse coating lines and thus penalize a company like Textured Coatings of America which has devoted its efforts to developing niche market coatings that otherwise would not have been developed because the volumes are too small to interest large manufacturers with diverse coating lines.

MASTIC TEXTURED COATINGS

These coatings have the appearance and consistency of liquid stucco. This is a highly specialized coating system that Textured Coatings of America, Inc. has manufactured for over thirty-nine years.

The solvent-based mastic is specified by architects for commercial application and also available to the Home Improvement market via contractors. The mastic textured coatings will weatherproof for fifteen to twenty years. This system meets Federal Specification TTC 555 B.

7-10 **Technical Justification:** The highlights of this specification are: (1) Resistant to 98 miles per hour wind driven rain (2) Permeability requirement (3) Minimum 60% solids (4) Flexibility and (5) Impact resistance.

It also has a Class A Fire Rating per ASTME 84, and has passed a 7,500 hours weatherometer test. The challenge in applying this coating at a specification of 50 square feet per gallon is to maintain a wet edge in the coating, especially when making multiple drops on a stage for high-rise buildings. A solvent film will stay wet longer than a latex mastic and will accept subsequent coating application for uniformity. Under the same conditions, a latex mastic forms a dry skin before the next application coat is applied. This results in line humps leaving an undesirable appearance. In addition, hot weather conditions have undesirable effects with latex mastics, producing bubbling due to fast surface skinning over a liquid base. 7-10

Please note your survey data for mastic textured coatings does not show any sales volume above 150 grams per liter of VOC. All of TCA's products within this category are above 150 grams per liter.

Our solvent based mastic VOC's can vary depending on the texture and variation on perlite absorption. The perlite is used for different gradations of texture. We request that the VOC of 300 grams per liter be sustained. This category was never considered for reduction by the SCAQMD. TCA does not understand why this agency is choosing to attack this category when the total volume sold in California is insignificant. These products play a vital role protecting this state's infrastructure and the 50 grams per liter savings does not represent any significant VOC reductions.

Additional VOC Emissions:

7-11 **Inability to Use Averaging:** We are a specialty high performance coating manufacturer and therefore do not manufacture coatings which lend themselves to very low VOC content, e.g., flat interior coatings. We do make every effort to lower the VOC content of our coatings. The averaging provisions can only be effectively used by companies with diverse coating lines and thus penalize a company like Textured Coatings of America which has devoted its efforts to developing niche market coatings that otherwise would not have been developed because the volumes are too small to interest large manufacturers with diverse coating lines.

In conclusion we urge that this board mandate the inclusion of the additional coating categories referenced above, put forth in this document and recommended by the NPCA. I believe that more time is needed before a sound decision can be made regarding the Air Resources Board's massive proposed reductions of VOC limits. This would allow a more thorough review of technologies and results of a recent AIM coatings performance survey commissioned by the SCAQMD.

7-12 Please recognize that TCA currently employs 65 people. If these limits go into effect, one of the outcomes for TCA will be to close its Los Angeles factory and re-locate it outside of the state of

7-12 California. This would eliminate the livelihood all of our California employees as well as thousands of other people who make their living by selling and applying TCA's products in the state of California. This could be economically and socially devastating for many of our employees, some who have been employed with TCA in excess of 25 years or more and whose livelihoods depend on the operation of this factory.

Sincerely,

Kevin Worrall

Kevin Worrall
Chief Chemist

Enclosure (tilt-up photographs)

AMERON
INTERNATIONAL

Christine Stanley
V.P. Technology

PROTECTIVE COATINGS GROUP
Headquarters
Brea, California 92821

FAX!

FROM: Christine Stanley **DATE:** July 20, 1999

TO: CARB **FAX:** 916/322-6088

ATTN: Jim Nyarady **PAGES:** 2 (Including cover sheet)

SUBJECT: SCM FOR ARCHITECTURAL COATINGS, COMMENTS ON NOP

Following are our comments on the NOP. These include an overview of the comments made to you during our telephone conference of 6/16 and include the data on nuclear coatings you requested.

8-1 1. We do believe there is a need for the Chemical Storage Tank Coating category as in South Coast's Rule 1113.

8-2 2. We do believe there is a need for Nuclear Coatings as defined in the National AIM Rule. Our research shows that an average nuclear power plant will use up to 500 gallons per year on maintenance of Level 1 and Level 2 areas. The worst case would be if a plant completely repainted all these areas which would require approximately 4000 gallons per unit. This is an unusual occurrence and not normally expected through the life of the plant but gives you an idea of worst case.

8-3 3. The definition of tint base could be misinterpreted to include job sites and traditional paint stores only and exclude warehouses; we suggest that the definition used in South Coast's Rule 1113 be used.

8-4 4. We cannot envision all the technology needs for the industrial maintenance market to meet the limits set forth for 2006. We believe, at this time, that these limits need not be set and that the second tier limits can be worked on after the effective date of the first tier when it will be clearer as to the available technology.

8-5 5. We believe that to meet the 2002 Industrial Maintenance Limits, some provision has to be made for low volume, non-compliant special use products. This could be averaging, variance procedure and/or small volume exemption. It is not possible for us to know every present use or foresee every future use of our products. As our customers change their products and processes, so their coatings needs change. As you reach the limits proposed, many technologies are no longer available to meet these new needs and we do not know if those remaining will do the job.

8-6 6. We believe that some consideration must be given to atmospheric conditions during application of coatings. The South Coast has a very moderate climate that lends itself to easier coatings applications. This is not true for the rest of California where both very high temperatures, low temperatures and high humidity environments can exist. High temperatures can drive solvent from a coating very quickly and thinning with very slow solvents can be necessary to apply a continuous film. Low temperatures lead to thicker material that requires fast solvent to thin the material to achieve atomization during spraying or flow and leveling during brush and roll applications. In low temperatures and high humidities, water-based products will not dry and consequently, these coatings cannot be used in these conditions. We would suggest a higher limit for applications that have such conditions. Since all the technology needed to meet the 2002 limits is not yet available, we find it very difficult to determine what that limit should be but suggest that 340 gms/liter may be appropriate.

Please call me if you have any questions at 714/529-1951, Ext. 212.

CS:rb

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July 9, 1999

Mr. Jim Nyarady,
Manager Strategic Evaluation Section,
Stationary Source Division
Air Resources Board
2020 L Street, P.O. Box 2815
Sacramento, CA 95812

Subject: Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

9-1

Thank you very much for your e-mail dated June 1999. Although the information you provided is clear, I would like to point out to you, but perhaps unnecessarily, the final ruling of the EPA, wyth regard to the necessity of a separate category for curing and sealing compounds, allowing a VOC limit of 700 g/l for this category.

I am sending you a copy of this document; the relevant text starts on page 72.

The arguments with regard to low temperature can also be made for a high temperature environment, if not even stronger here in California with our relatively low humidity

As you may know, the compressive strength of concrete is usually tested at 28 days. In warm and dry weather, one can find considerably lower strength in the same concrete mix design when this concrete is cured with a curing compound with a VOC limit of 350 g/l as opposed to using a curing and sealing compound with a VOC limit of 700 g/l. This difference can have an immediate and long-term effect on the quality and durability of the structure.

This occurs because concrete needs moisture to properly gain strength.

Consider the moisture loss of these two different classes.
Curing compounds - 0.055 g/cm2 at 200 ft. per gallon.
Curing and sealing compounds (30% solids, solvent based material, with a VOC limit off 625 g/l - 0.030 g/cm2 at 300 ft. per gallon.

A huge difference in performance!

Good curing is of vital importance to the quality of the concrete. The effects of poor curing, or using sub- standard materials can cause rapid wear on concrete surfaces, especially those surfaces subjected to hard rubber and steel wheels. Curing affects primarily the concrete in the cover (top 1 ½ - 2") to the reinforcement, and by definition, this is the concrete that protects the reinforcement from corrosion by the ingress of aggressive agents.

9-1 Also, most commercial projects desire a final surface that is more durable and attractive than can be achieved with lower solids materials. Both ASTM and at least two federal agencies recognize the need for curing and sealing compounds.

If you consider the re-coating requirements with a lower solids material, you may conclude that substantially more VOC's will be released than with a one-time application of a higher solids material from the curing and sealing category.

I hope that this information will be considered in your deliberations and that a VOC limit of 700 g/l can be universally adopted in California as well. Thank you very much for your attention in this matter.

Sincerely,

William F. (Pim) VanSisseren

P.S. Please add us to your mailing

Encl: 1

6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 59

[AD-FRL-6149-7]

RIN 2060-AE55

National Volatile Organic Compound Emission Standards for Architectural Coatings

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This action promulgates national volatile organic compound (VOC) emission standards for architectural coatings pursuant to section 183(e) of the Clean Air Act (Act). This final rule is based on the Administrator's determination that VOC emissions from the use of architectural coatings have the potential to cause or contribute to ozone levels that violate the national ambient air quality standards (NAAQS) for ozone. Ozone is a major component of smog which causes negative health and environmental impacts when present in high concentrations at ground level. The final rule is estimated to reduce VOC emissions by 103,000 megagrams per year (Mg/yr) (113,500 tons per year [tpy]) by requiring manufacturers and importers to limit the VOC content of architectural coatings.

EFFECTIVE DATE: The effective date is [insert date of publication in the FEDERAL REGISTER]. The incorporation by reference of certain publications listed in the regulation

EPA has retained the VOC content limit of 250 g/l for roof coatings in the final rule.

Concrete curing compounds. Several commenters commented on the proposed VOC content limit of 350 g/l for concrete curing compounds, which are used predominantly in highway construction. Seven commenters stated that the proposed limit for concrete curing compounds is achievable based on existing technology, and one of these commenters maintained that the limit could be lowered to 300 g/l. On the other hand, one commenter took issue with the achievability and performance at the proposed limit of 350 g/l. The latter commenter suggested a VOC content limit of 625 g/l for this category, arguing that the proposed limit would eliminate most concrete curing membranes from the market, and that many companies do not sell curing compounds in States that have the 350 g/l limit.

In addition to consideration of these comments, the EPA reviewed the VOC content limits for this category in State rules. Several States, including Arizona, California, Massachusetts, New Jersey, and New York have had a VOC content limit of 350 g/l for concrete curing compounds for several years. The availability of compliant products in these States suggests that the limits are achievable, notwithstanding that not all manufacturers have chosen to market in those States. Based on the information provided by the commenters in favor of the proposed limits and upon the existing State rules, the EPA has concluded that the proposed VOC content limit of 350 g/l for concrete curing compounds is technologically achievable and has retained this limit in the final rule.

Graphic arts coatings. Two commenters indicated concern about the performance of shop-applied graphic arts coatings at the proposed VOC content limit of 500 g/l. One commenter's specific concerns with coatings at this level included difficulty in achieving variation in gloss levels, variation in the required drying times in the drying room (implying shop-applied coatings), need for greater application amounts, and higher costs. Graphic arts coatings recommended by the manufacturer solely for shop applications are not required to meet the 500 g/l VOC content limit. As discussed earlier, the EPA has revised the definition of architectural coating to clarify that coatings recommended by the manufacturer solely for shop application are not subject to the rule. In addition, the definition of graphic arts coatings has been modified by removing the reference to in-shop coatings, and a definition of "shop application" has been added to the rule.

Based on a review of the 1990 VOC emission inventory survey and State architectural coating rules, the EPA argued that multipurpose waterproofing sealers at 400 g/l do not meet minimum performance criteria for clear waterproofing sealers (that is, 60-percent water repellency for wood and 1 percent or less water absorption for brick). The representatives stated that 400 g/l products are high-solids products that may leave an oily residue or cause darkening of the surfaces to which they are applied and, thus, product performance may not meet industry standards. Combining clear and opaque waterproofing treatment sealers into one category is consistent with all existing State rules, which do not divide the category into clear and opaque waterproofing sealers and treatments. The State architectural coating VOC content limits for waterproofing sealers and treatments are either 400 g/l (for example, Arizona and California) or 600 g/l (Massachusetts, New Jersey, and New York).

E. Addition of New Coating Categories

The EPA received requests to establish 20 new coating categories in the final rule. In response to these comments, the EPA has established seven new categories: (1) calcimine recoaters; (2) concrete surface retarders; (3) concrete curing and sealing compounds; (4) conversion varnishes; (5) zone markings; (6) faux finishing/glazing; and (7) stain controllers. The EPA also evaluated requests, but did not establish new categories, for the following coatings: (1) adhesion promoters; (2) asbestos and lead-based paint encapsulation; (3) concrete/masonry conditioners; (4) porcelain repair coatings; (5) marine/architectural coatings; (6) alkali-resistant primers; (7) tung oil finishes; (8) lacquer stains; (9) elastomeric high performance industrial finishes; (10) low solids coatings; (11) oil-modified urethanes; (12) thermoplastic (treatment) sealers; and (13) zinc-rich coatings. In general, new categories were not established for these coatings because the EPA determined that it is technologically and economically feasible for coating manufacturers and importers to achieve compliance with the rule. Further discussion of the rationale for the EPA's decisions on the new categories is contained in section 2.2.4.2 of the Architectural Coatings BID referenced under the ADDRESSES section of this preamble.

In general, the EPA considered creation of new categories if commenters submitted information supporting higher VOC content limits for such products than the otherwise applicable limits. The EPA considered the data submitted by commenters and obtained all reasonably available additional data to evaluate these requests. In cases where the EPA concluded that the proposed emission limits were not achievable, the EPA established a separate category with an appropriate emission limit. The following is a discussion of the rationale for each of the new coating categories and its VOC content limit.

Calcimine recoaters. Under the proposed standards, calcimine recoaters would have been subject to the VOC content limit for interior flat coatings (250 g/l). However, several commenters stated that calcimine recoaters have a higher VOC content of 475 g/l, cannot be reformulated, are low-volume coatings, and serve a unique function of recoating water soluble calcimine paints. These paints are used in Victorian and Early American homes, especially on ceilings. Due to their low density, calcimine recoaters do not disbond the existing calcimine ceiling coatings, as conventional (250 g/l VOC) high-solids flat alkyd paints would tend to do. If a calcimine recoater is not used, the only alternative is to remove the existing coating, which is labor-intensive and expensive. Because these low-volume coatings reportedly cannot be reformulated, their composition is unique, and there is no substitute for these products, the EPA has added a separate category for calcimine recoater products to the rule with a VOC content limit of 475 g/l.

Concrete curing and sealing compounds. Under the proposed rule, these coatings would be subject to the 350 g/l VOC content limit for concrete curing compounds.

However, commenters presented information not previously considered by the EPA demonstrating that compounds designed for curing and sealing, as opposed to those designed for curing only, have different technical specifications that make it difficult to achieve the 350 g/l level. Concrete curing and sealing compounds function as longer term sealers that provide protection, aesthetic benefits, and durability in addition to curing. Commenters pointed out that there are separate American Society for Testing and Materials (ASTM) methods available for each of these categories and that ASTM Committee experts and at least two government agencies consider them distinct categories with different performance requirements.

Through follow-up phone calls with several concrete curing and sealing coating manufacturers, the EPA confirmed that concrete curing and sealing products are typically sold at levels much higher than 350 g/l. While waterborne products below 350 g/l are available, some industry representatives cited drawbacks such as poor low-temperature performance and stability. Since these products must often be used in low-temperature environments, the EPA agrees that the VOC content limit should reflect this usage. Therefore, the final rule includes a new category for concrete curing and sealing compounds. Based on an analysis of VOC content and sales data for these products, the EPA has established the VOC content limit at 700 g/l.

Concrete surface retarders. Concrete surface retarders do not fall within any of the proposed categories except the general category for interior flat coatings with a VOC content limit of 250 g/l. These products are generally used in a manufacturing setting at a precast facility, but a small volume of products are field-applied. Commenters argued that these products cannot meet the 250 g/l level and, furthermore, that they are not coatings and should not be subject to the rule. However, they requested a VOC content limit of 780 g/l if the EPA regulated these products.

The EPA has concluded that concrete surface retarders meet the rule's definition of a "coating." Concrete surface retarders that are recommended by the manufacturer for use in the field at job sites are, therefore, subject to the rule. When retarders are recommended by the manufacturer solely for use in a manufacturing setting, such as at a precast facility, which is the typical situation, they are not subject to the rule. The EPA determined that concrete surface retarders that are used in the field at the actual job location are specialized, low-volume coatings used in limited circumstances, and there is no lower VOC content substitute for the function of these products. Therefore, the EPA has included a separate category for these products in the final rule, with a VOC content limit of 780 g/l as requested by the commenters.

Zone marking coatings. Under the proposed rule, zone marking coatings were subject to the 150 g/l VOC content limit for traffic marking coatings. Zone marking coatings are those used to mark surfaces such as parking lots, driveways, sidewalks, and airport runways; they are generally applied by small commercial applicators. In contrast, traffic marking coatings are applied to streets and highways and are usually applied by large contractors or State Departments of Transportation. The commenters noted two issues associated with meeting the 150 g/l content limit for zone marking coatings. First, the 150 g/l content limit could only be met with waterborne coatings, which require different application equipment than solventborne coatings. Small applicators would be disproportionately impacted by the cost of acquiring the new equipment that is compatible with waterborne zone marking coatings. Secondly, the commenters asserted that waterborne zone marking coatings do not dry or cure properly during high humidity or low temperatures, conditions under which they must sometimes be applied.

After consideration of these comments, the EPA has added a separate category for zone marking coatings and has

The Valspar Corporation
1101 Third Street South
Minneapolis, MN 55415
612-332-7371

July 22, 1999

Mr. Jim Nyarady
Manager, Strategy Evaluation Section
Air Resources Board
2020 L Street
Sacramento Califonia 95812

Dear Mr. Nyarady:

Subject: Comments Regarding the June 10 SCM for Architectural Coatings

I am writing to express my concern about the reductions in Volatile Organic Content limits for architectural and industrial maintenance coatings under the Suggested Control Measure dated June 10, 1999. My company manufactures many of the coatings that are at issue.

Based on Valspar's product formulating versus product performance experience developed over the past 193 years, I can say that the proposed limits will likely eliminate a number of important coatings which protect homes and commercial buildings in the regulated districts of California. 10-1

Coatings are designed differently for a wide variety of substrates and performance expectations. Contrary to the opinion heard frequently from non-industry people that "paint is paint", coatings are developed differently for application over different surfaces, for different use conditions and different weather or environments. Unique chemistries are used in developing binders for these various coatings. The amounts and types of solvents used depend on application conditions, the length of drying time allowed and the extremes which may be encountered in temperature or humidity. Some coatings, because of the types of binders and application characteristics necessary for a particular application, require the use of higher levels of solvent than others. It may not be possible to develop a low VOC or waterborne version of a particular coating that works.

10-2 The VOC level of 100 g/L proposed for Flat Coatings in 2001 may allow the sales of medium quality flat latex wall paints, but consumers will not be allowed to purchase high quality, performing flats that will stand up to repeated washings and will have excellent application and freeze-thaw stability characteristics. The proposed 2008 limit of 50 g/L will make this possibility even less likely. Freeze-thaw may not be important in certain sections of California, but it is important in the northern states, whose regulators are keeping close watch on what happens in California. That implication is of much concern to us and much of the coatings industry.

10-3 The proposed non-flat limits of 150 g/L and 50 g/L in 2002 and 2006 have similar concerns associated with them. In addition to freeze-thaw, application and film durability issues, there is the concern of poor film formation at lower temperatures. At temperatures between 45 and 60, non-flat latex products will not form a complete, uniform film unless the appropriate type and level of coalescing agent (sometimes called cosolvent) is used. At 50 g/L, especially, this becomes a very large concern.

10-4 We encourage the CARB staff to more thoroughly investigate the effects of VOC reduction on the performance of flats and non-flats before making decisions on the limits.

10-5 We think the VOC levels for floor coatings of 100 g/L and 50 g/L for 2002 and 2006 are too low for acceptable floor paints. Our current latex floor paints are higher than 150 g/L, and they are only marginally acceptable for resistance to heavy foot traffic, repeated washings and the ability to retain adhesion properties while wet. They are only available in an eggshell gloss range. Two component low VOC epoxies can be used for floors, but they are not safe for homeowners to use, and they are more expensive and more difficult for homeowners to use. Most floors are too large to enable practical use of the quart exemption for this product type.

10-6 The VOC limit for Quick Dry Enamels is proposed at 250 g/L for 2002 and 50 g/L for 2006. We think the VOC for this product type needs to be at least 400 g/L. Waterborne enamels don't dry fast enough, are not high enough in gloss, and don't have enough block resistance to be used in areas where QD Enamels are typically used.

10-7 A separate category for Specialty Primers should be established with a VOC limit of 400 g/L. Waterborne primers do not prevent water soluble stains like wood tannins and smoke stains from bleeding through to a waterborne topcoat. High solid solvent borne primers do not dry to recoat quickly enough. The proposed Primers, Sealers, and Undercoaters limits of 200 g/L for 2002 and 100 g/L for 2006 will not allow for the Specialty Primer type. Houses sided with cedar are simply to large to practically use the quart exemption.

10-8 Another category for Masonry Conditioners or Sealers should be established with a VOC limit of 550 g/L. This product type can be used to seal "chalky" surfaces including, but not limited to, weathered concrete or chalky, weathered paint surfaces. Waterborne primers simply <u>do not penetrate</u> chalk sufficiently to insure adequate adhesion.

10-9 The SCM proposes a VOC limit of 250 g/L for semi-transparent stains in 2002. Waterborne semi-transparent stains open the wood grain and dry too fast, resulting in a splotchy appearance. Quarts of solvent borne high VOC stains are not practical on large jobs. High solids solvent borne stains do not penetrate and dry well enough to perform acceptably.

10-10 The limit of 250 VOC waterproofing sealers for wood will essentially require the use of waterborne sealers. The problem with recoating these is that they are formulated to repel water, and therefore a second treatment will not adhere and will peel. Again, quarts of traditional waterproofing sealers are not practical for using on large areas like wood decks.

10-11 In closing, we encourage the CARB staff to research the technological possibilities of achieving the proposed limits, with a mind to not only whether products are currently available, but also whether they are available for the wide variety of performance requirements and environmental conditions that may be encountered in the field. The industry is very much concerned with meeting the needs of its customers, and the net result of many of the VOC reductions will be products with lower performance capabilities at a higher price and with a more frequent need for repainting.

Sincerely,

Kelley J Brandt

Kelley Brandt
Director, Regulatory Affairs
The Valspar Corporation
h990722h

SIERRA
PERFORMANCE
COATINGS

July 22, 1999

Via Facsimile

Mr. Jim Nyarady
Manager
California Air Resources Board
Strategy Evaluation Section
2020 L. Street
P.O. Box 2815
Sacramento, CA 95812

Re: Comments to SCM, NOP and Initial Study

Dear Mr. Nyarady:

On behalf of itself, its customers and others affected by the release of solvents from paints and coatings, Sierra Performance Coatings, Inc., a California corporation that offers a full line of high performance, zero-VOC coatings, respectfully submits the following comments on the California Air Resources Board's (ARB) SCM, NOP, and Initial Study for architectural coatings.

11-1 For the reasons that follow below, ARB's proposed rule for industrial maintenance coatings: (i) sets VOC limits that, at 250 g/l, are too high; and (ii) makes the effective date, currently proposed for July 1, 2002, too late. However obscured by certain industry players, the basic reality of the paint and coatings industry is that the necessary raw materials to make high performance, ultra-low products are already in the market; and a number of paint companies, including Sierra Performance Coatings, are already in the market with ultra-low VOC coatings whose performance is superior to existing solvent-borne products. Accordingly, the ARB should lower the VOC limits for industrial maintenance coatings to 100 g/l and should implement that standard as of January 1, 2001.

◆ SAFER INDUSTRIAL FINISHES™ ◆ SAFER INDUSTRIAL FINISHES™ ◆

Sierra Performance Coatings, Inc.

330 Primrose Road, Suite 502 ▪ Burlingame, California 94010 ▪ Phone: 650-548-5188 ▪ Fax: 650-548-5373

I. THE PROPOSED RULE DOES NOT EMPLOY THE BEST AVAILABLE CONTROLS.

11-2 The proposed rule fails to adopt the "best available controls" and therefore the ARB, as the implementing agency, would violate its duty under the federal Clean Air Act if the proposed rule were implemented.

Section 183 (e) of the Clean Air Act requires the Environmental Protection Agency to regulate consumer and commercial products using "best available controls" ("BAC"). 42 U.S.C. § 7511b(e)(3)(A). The Clean Air Act defines BAC to require "the degree of emissions reduction the Administrator determines, on the basis of technological and economic feasibility, health, environmental, and energy impacts, is achievable through the application of the most effective equipment, measures, processes . . . including chemical re-formulation or product substitution." 42 U.S.C. § 7511b(e)(1)(A). According to the EPA, BAC is a "system of regulation that encourages product reformulation to meet VOC content limits" in light of the fact that "pollution prevention is the most effective means of achieving VOC emissions reductions." 42 U.S.C. § 7511b(e)(3)(A) (Preamble).

The practical problems with the proposed rule are that there are in fact high performance paints and coatings in the market today that contain significantly lower VOC content than the limits proposed by the ARB; and there are commercially available raw materials to produce industrial maintenance coatings at substantially lower levels than proposed:

11-3 1. Despite its flaws, the preliminary Phase II Assessment Study commissioned by the South Coast Air Quality Management District indicates that low-VOC products perform generally just as well as high-VOC products and, in fact, outperform them in terms of brushing and sag resistance, rust resistance, and mar resistance. The performance characteristics of low-VOC products show they are technologically feasible as currently designed.

11-4 2. High-performance, low-VOC paint products are commercially available. A wide range of companies - such as Sierra, Sherwin-Williams, Ameron and Carboline - sell high-performance, low-VOC epoxy, urethane, and acrylic products. (See the attached product profile sheets.) All are breadand-butter products with under 250 g/l VOC content that perform just as well or better than solvent-borne products with higher VOC contents.

3. There have been tremendous advances in raw materials technology over the last five years, so that low-VOC resins and curing agents are now common. Shell, Air Products, Rohm & Haas, Vianova, Hoechst, Engineered Polymers Solutions and Specialty Polymers all make state-of-the-art, low-VOC waterborne acrylic, epoxy and polyurethane resins and curing agents that perform as well or better than solvent-borne systems for industrial maintenance coatings. 11-4 (See the attached product profile sheets.) Shell's epoxy technology, for example, may be formulated into sealers, primers, and low to high sheen topcoats for various industrial maintenance and specialty architectural applications with very strong adhesion, humidity resistance, and corrosion resistance properties (see attached product data sheet). Indeed , as long ago as 1994, the Shell Development Company published an article stating that state-of-the-art materials as of that time allow VOC's for metal formulations to be reduced from the 480 g/l for the traditional solvent-based systems to the range of 120-240 g/l.[1] The article concludes that "most significantly, the advances in waterborne epoxy technology have afforded significant VOC reductions along with the necessary corrosion and humidity resistance for coatings that protect metallic substrates. Whereas the prior generations of waterborne epoxy systems have found widespread use primarily on masonry substrates, the latest developments have allowed for their expansion into new applications on metal."[2]

II. A RULE OF 100 G/L VOC's SHOULD BE ADOPTED.

The widespread commercial availability of high-performance, zero-VOC coatings and raw materials -- let alone low-VOC products under 100 g/l -- demonstrate that a 100 g/l limit is technologically and commercially feasible. And, with the necessary raw materials so widely commercially 11-5 available, low-VOC paints and coatings can be produced and/or re-formulated easily and efficiently by any paint companies. Indeed, every raw material supplier provides starting formulae for making paint using their products, much the way a flour company provides recipes for cakes.

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[1] "An Overview of Ambient-Cure, Waterborne Epoxy Resin Coating Technology," by Ernest C. Galgoci, Shell Development Company, 2147-94.

[2] Id. at page 1.

6 1. Preliminary results of the SCAQMD Phase II Assessment Study that compare the performance of zero-VOC, low-VOC, and high-VOC products show that zero-VOC products perform best overall. Zero-VOC products display superior properties as to leveling, wet and dry film, blistering and filiform corrosion resistance, taber abrasion, and adhesion to substrates whereas high-VOC products rate highest only on film appearance and flexibility.

11-7 2. SQAQMD identified some 55 commercially available high-performance industrial maintenance coatings at 100 g/l VOC content or lower appropriate for virtually every conceivable use and application. 50 of the 55 high-performance industrial maintenance coatings identified are zero-VOC. Zero-VOC products are proven as technologically and commercially available.

Sierra Performance Coatings' product line is a case in point. Sierra has a full-line of 100% epoxy zero-VOC paints and coatings, including concrete floor enamels, industrial DTM metal enamels, and industrial metal primers. Sierra also sells a line of epoxy-acrylic wall and trim finishes and polyurethane DTM metal enamels. As the attached product profile sheets attest, Sierra's products perform at equal or superior levels of similar high-VOC products and, in particular, display superior dry times and adhesion. Sierra's products are widely commercially available with a significant presence in the Western United States. Customers include a national car manufacturer/dealer that painted concrete floor service bays with a non-slip coating; the U.S.S. Hornet, which painted all surfaces of the 300 yard aircraft carrier inside and out with zero-VOC products to encapsulate and protect against rust; a large OEM company which used a DTM on metal frames to achieve high salt spray and impact resistance; and a major fresh food packager that coated steel, masonry, and wall board in a highly sanitary, high-moisture, chilled packaging facility. In every one of these cases, solvent-borne products performed worse than Sierra's zero-VOC coatings.

11-8 3. As a final matter, Sierra strongly objects to the use of an averaging provision as an alternative in the draft program EIR. This provision is a loophole that strangles the entire rule. It has no basis under the Clean Air Act and it has no practical hope of being workable. There is great potential for circumvention of the VOC standards, which could possibly render any limits pointless.

III. THE FAILURE TO ADOPT THE BEST AVAILABLE CONTROLS WILL CAUSE SERIOUS ADVERSE HEALTH EFFECTS.

VOCs are the main component in forming ground level ozone.[3] Exposure to ground level ozone can damage lung tissue and cause serious respiratory illness.[4]

According to the SCAQMD report on health effects of ozone, "individuals exercising outdoors, children and people with preexisting lung disease such as asthma and chronic pulmonary lung disease are considered to be the most susceptible sub-groups for ozone effects. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported.

Ozone exposure under exercising conditions is known to increase the severity of the above mentioned observed responses. Similarly, animal studies suggest that exposures to a combination of pollutants that include ozone are more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure
11-9 diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes."[5]

Adverse health effects are even more pronounced for workers in the paint industry who are exposed to high-VOC solvents, even at low levels, according to several studies.

11-10 One 1997 report reviewed a range of occupational studies of paint workers and recommended a reduction of solvent limit values due to a correlation between solvent exposures and neuropsychiatric disorders, mental symptoms, and impaired neurobehavioral performance.[6] A 1995 study found that paint manufacturers exposed to solvents showed diminished memory, reaction time, manual dexterity, and

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[3] EPA Fact Sheet, Final Air Regulation for Architectural Coatings, August 14, 1998.

[4] Id.

[5] South Coast Air Quality Management District, 1997 Air Quality Management Plan, Chapter 2, Air Quality and Health Effects.

[6] Mikkelsen, S., "Epidemiological Update on Solvent Neurotoxicity," 1997 Environmental Research, Vol. 73, Nos. 1/2, pages 101-112.

10 olfaction.[7] Additionally, two other studies have concluded that exposure to solvents in the painting industry is associated with adverse effects on the central nervous system such as forgetfulness, lassitude, disorientation, and dysphoria.[8]

CONCLUSION

11-11 The proposed rule fails to adopt the "best available controls" and is, therefore, inconsistent with ARB's duty under the Clean Air Act. Current feasible technology supports VOC limits much more stringent than those proposed by the ARB. Lower limits are essential both to help non-attainment areas reach their clean air goals and to protect the public's health. The public should not be required to continue to be exposed to harmful emissions from paint formulations when cleaner alternatives are currently available. The ARB -- responsible for clean air in California -- must under the Clean Air Act take a lead role in requiring cleaner and safer paints and coatings. The ARB should lower the VOC limits for industrial maintenance coatings to 100 g/l and should implement the rule earlier as of January 1, 2001.

Respectfully Submitted,

Patrick K. Shannon
General Counsel

(attachments to follow via regular mail)

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[7] Bolla, K.; Schwartz, B.S.; Stewart, W; Rigani, J.; Agnew, J.; Ford, D.P., "Comparison of Neuorbehavioral Function in Workers Exposed to a Mixture of Organic and Inorganic Lead and in Workers Exposed to Solvents," 1995-02 American Journal of Industrial Medicine, Vol. 27, No. 2, pages 231-246.

[8] Baker, E., et al., "Neurobehavioral Effects of Solvents in Construction Painters," 1988 Journal of Occupational Medicine, Vol. 30, No. 2, pages 116-123. See also Olson, A, "Effects of Organic Solvents on Behavioral Performance of Workers in the Paint Industry," 1982 Neurobehavioral Toxicology and Teratology, Vol. 4, No. 6, pages 703-708.

Sierra Performance Coatings, Inc.
Comments to CARB SCM, NOP, Initial Study

ATTACHMENTS

1. Sherwin-Williams water based epoxy finish
2. Sherwin-Williams water based epoxy primer
3. Sherwin-Williams water based urethane
4. Sherwin-Williams DTM acrylic coating
5. Sherwin-Williams DTM acrylic primer
6. Ameron Amerlock 400 high-solids epoxy
7. Ameron PSX 700 low-VOC epoxy
8. Carboline cross-linked epoxy 890
9. Carboline cross-linked epoxy 893
10. Carboline acrylic aliphatic polyurethane
11. Carboline modified aluminum epoxy mastic
12. Carboline water-borne acrylic
13. Sierra Performance Coatings product line
14. Shell Epi-Rez low-VOC waterborne resin and curing agent
15. Air Products and Chemicals zero-VOC polyurethane resin
16. Air Products and Chemicals zero-VOC waterborne epoxy resin
17. Specialty Polymers zero-VOC acrylic emulsion
18. Epidemiological Update on Solvent Neurotoxicity
19. Comparison of Neurobehavioral Function in Workers Exposed to Solvents
20. Neurobehavioral Effects of Solvents in Construction Painters
21. Effects of Organic Solvents on Behavioral Performance of Workers in the Paint Industry

Flame **Control**
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July 12, 1999

Air Resource Board
2020 "L" Street, P.O. Box 2815
Sacramento, California 95812

Attention: Mr. Jim Nyarady
Manager, Strategy Evaluation Section

Reference: California Code of Regulations
Title 14, 15082(a), 15103 and 15375

Dear Mr. Nyarady:

This letter is in response to the above referenced notice we received, concerning the Air Resources Board's suggested control measure for architectural coatings.

The proposed VOC limits for fire retardant coatings are lower than the fire retardant coating industry can achieve, at the present time. While there are a couple of old coatings that could possibly meet ARB's proposed requirements, they are coatings that were developed back in the 50's, and they have very poor quality, have little or no washability or cleansibility, and their fire retardant qualities are adversely effected (diminished) when exposed to humid conditions.

12-1 As fire retardant coatings are primarily specified and utilized because of their ability to reduce the rate fire will spread over a surface, it is imperative that the fire retardant coatings possess lasting qualities. Needless to say, the use of fire retardant coatings meeting the proposed VOC requirements, but lacking in permanency, would lead to a false sense of security and could have disastrous consequences if fire should strike.

I believe it is also worthy to point out, that while a fire retardant coatings may even be listed by the Underwriters' Laboratories, it does not mean that the coating possesses any degree of permanency. The Underwriters' Laboratories test is primarily concerned with establishing the fire hazard classifications for the coating as applied, and the useful life of these coating materials are not investigated (reference Page 57 of the 1999 Underwriters' Laboratories Building Material Directory; copy of that page herein enclosed).

It is our firm belief, that the proposed VOC limits for fire retardant coatings should be changed as follows;

Fire Retardant	7/1/2001 Proposed VOC limits	Request VOC Limits to be changed to
Pigmented coating	250 g/L	350 g/L
Clear coating	250 g/L	650 g/L

12-1 This increase in the grams/liter (VOC) will serve a two fold purpose;

1] It will allow the application of thin film, modern day, fire retardant coatings. These modern day, fire retardant coatings possess the maximum degree of durability, cleansibility, and fire retardant permanency that is obtainable with todays technology.

2] It will also allow the use of tested and rated sealers and topcoats, that were originally fire tested with many of the fire retardant coatings, thereby insuring that the finished surface will comply with the applicable California state and local building fire code requirements, both when freshly applied and for years to come.

12-2 Another major point of contention, is the wording used in the "Definitions" section, to define fire retardant coatings. This definition as written (reference page 2, section 2.12, Fire Retardant Coatings), is incorrect and MUST be changed. The facts behind this statement are as follows:

A) The use of the wording, as it is now written in this definition, would prevent the sale and use of special purpose fire retardant coatings designed and tested for application to surfaces, other than Douglas fir lumber, i.e., cellulose board, acoustical tile, plywood, etc.. It would also restrict the use of special purpose fire retardant coatings, which are tested to comply with other fire code standards, and are applied to such substrates as structural steel, cedar shingles, structural timbers, electrical & communication cables, etc..

B) The wording "flame spread - index of less than 25" restricts the sale and use of fire retardant coatings, to only those which have been assigned a Class "A" flame spread rating, i.e., flame spread index 0 - 25. As many California building codes also specify the use of Class "B" rated materials, i.e., flame spread index 26 - 75, it would indicate a need to include a broader definition for this category of coatings.

C) A second point concerning the statement "less than 25, as now written, would mean that rated products having flame spread indexs of 0, 5, 10, 15, and 20 would be the only products classed as fire retardant coatings, but not a product having a flame spread index of 25.

D) The statement "...tested in accordance with ASTM Designation E-84-87..." is very restrictive. The last two numbers, 87, indicate the year in which the last issuance of the standard was published. If it is left worded as is, no fire retardant coatings tested under ASTM E-84-76, E-84-81, E-84-83, E-84-92 or with other revisions or publications of future years, would be allowed to be used.

12-2

With the above thoughts in mind, we therefore request that the definition for "Fire Retardant Coatings" be changed to read as follows:

> Fire Retardant Coatings: Coatings which are fire tested and rated by an approved laboratory, and are used to bring building and construction materials into compliance with state and local fire building code requirements.

To give you a little insight as to our company's background and its activities, Flame Control Coatings is a world leader in the production of fire retardant paints, fire retardant varnishes, and fire protective (retardant) mastics. Our products are distributed by, and/or private labeled for, most of the major paint companies in the United States, such as Glidden's ICI Dulux, PPG, Sherwin-Williams, Benjamin Moore, Pratt & Lambert, and the Kelly-Moore Corp.. In addition, we also manufacture and private label our products for many smaller companies, under such well known trade names as Flamort Chemicals, Athey, Best Kote, and Wood-Tek.

12-3

We are also a supplier of fire retardant coatings to the General Service Administration. G.S.A.'s fire retardant coatings are manufactured to comply with various federal specifications, among them being Federal Specification TT-P-26C, TT-C-001883, and MIL-C-46081. Coatings meeting these federal specifications are utilized for fire protection of the barracks, aircraft hangers, office buildings, V.A. hospitals, and other federal government owned and leased properties throughout California. Coatings complying with the above specifications do not comply with the proposed 7/1/2001 California VOC requirements. However, they do comply with the current VOC limit.

12-4 We agree with the need to reduce the unnecessary release of VOC's. However, we do not believe it should take precedence in determining the type and quality of a coating that can be used, when it involves fire retardant coatings that are designed to reduce the spread of flames and save lives.

Without changes to ARB's proposed 7/1/2001 VOC limits for fire retardant coatings, quality products will no longer be available for sale and use in California. We, like most companies in the coatings industry, have been striving to develop quality, low VOC and water base coatings. However, todays low VOC and water base technology, that has been developed for the production of conventional architectural coatings, still is not suitable for the production of quality fire retardant coatings. Fire retardant coatings must have lasting durability to ensure they are serviceable, and that they retain their fire retardant qualities.

I would like to take this opportunity to thank you for allowing us to review this draft proposal and submit our comments and suggestions.

I, personally, plan on being at the ARB public hearing meeting, scheduled for November 18, 1999 and I would, therefore, request that I be informed as to the exact time and location where this public hearing will take place.

Very ~~truly~~ yours,

FLAME CONTROL COATINGS, INC.

Norman C. Oliver
President

NCO/bt

Price U.S. $16.00

Building Materials

1999

Contains
Listings and Classifications
in effect as of December 11, 1998

Please read information contained in paragraph 2 on page iv

Underwriters Laboratories Inc.®

Directory

Cementitious-Cement and Plaster-Mixtures (BLPR)—*Continued*

PROSTAR (THAILAND) CO LTD R16081
SAMUTHSAKHON INDUSTRIAL ESTATE 1/105 MOO 2
THASAI MUANG, SAMUTHSAKHON 74000 THAILAND

Cementitious mixture.

	Applied to Inorganic Reinforced Cement Board. in a Max Thk of 1/2 in.+.
Flame spreads	0
Smoke Developed	0

PROSTAR CONTRACT SERVICES PTE LTD R14613
6 SUNGEI KADUT ST 2, SINGAPORE 729228
SINGAPORE

Cementitious mixture.

	Applied to Inorganic Reinforced Cement Board. in a Max Thk of 1/2 in.+.
Flame spreads	0
Smoke Developed	0

PYROK INC R10453
1750 POWDER SPRINGS RD SW, MARIETTA GA 30064

Types HD, MD, CV27(B) cementitious mixtures.

	Applied to Inorganic Reinforced Cement Board
Flame spread	0
Smoke developed	0

Types Acoustement 20, 40 cementitious mixtures.

	Applied to Inorganic Reinforced Cement Board
Flame spread	0
Smoke developed	0

Type LD cementitious mixture.

	Applied to Inorganic Reinforced Cement Board
Flame spread	10
Smoke developed	0

RAPID FLOOR SYSTEMS R16096
920 HAMEL RD, HAMEL MN 55340

Cementitious mixture applied to inorganic reinforced cement board and identified as RF.

	Classification or Rating
Flame Spread	0
Smoke Developed	0

Cementitious mixture applied to inorganic reinforced cement board and identified as RFP.

	Classification or Rating
Flame Spread	0
Smoke Developed	0

Cementitious mixture applied to inorganic reinforced cement board and identified as RFU.

	Classification or Rating
Flame Spread	0
Smoke Developed	0

Also Classified in accordance with ASTME 136-93, "Standard Test Method For The Behavior of Materials in a Vertical Tube Furnace at 750 C".

SHIN SUNG TRADING CO LTD R14611
DONGWON BLDG 421-5 SHINDANG-DONG CHOONG-KU,
SEOUL KOREA

Cementitious mixture.

	Applied to Inorganic Reinforced Cement Board. in a Max Thk of 1/2 in.+.
Flame spreads	0
Smoke Developed	0

SOUTHWEST VERMICULITE CO R8213
5119 EDITH BLVD NE PO BOX 6287, ALBUQUERQUE
NM 87197

Applied to Inorganic Reinforced Cement Board In a Max Thk of 1/2 In.

	Type 4	Type 5	Type 5GP	Type 5EF	Type 5MD
Flame spread	10	10	10	10	10
Smoke developed	0	0	0	0	0

Applied to Inorganic Reinforced Cement Board In a Max Thk of 1/2 In.

	Type 8GP	Type 9GP	Type 8EF	Type 8MD	Type 9EF	Type 9MD
Flame spread	10	10	10	10	10	10
Smoke developed	0	0	0	0	0	0

Cementitious-Cement and Plaster-Mixtures (BLPR)—*Continued*

	Type FP-2	Type 7MP	Type FP-1A	Type TS-40	Type
Flame spread	5	5	5	5	5
Smoke developed	0	0	0	0	0

	Type FP-1B	Type TS-40G	Type 1BX	Type FP-1XR	Type 1XR
Flame spread	5	5	5	5	5
Smoke developed	0	0	0	0	0

SPECIALTY PRODUCTS INC R11944
1010 DEERE ST, FAIRBANKS AK 99709

Cementitious mixture applied to inorganic reinforced cement board.

	Applied to Inorganic Reinforced Cement Board
Flame spread	0
Smoke developed	0

W R GRACE & CO - CONN CONSTRUCTION PRODUCTS DIV R4339
62 WHITTEMORE AVE, CAMBRIDGE MA 02140

Cementitious mixtures applied to inorganic reinforced cement board and/or foamed plastic.

FOR SURFACE BURNING CHARACTERISTICS, SEE CLASSIFICATION MARKING OF UNDERWRITERS LABORATORIES INC. ON PRODUCT OR CARTON.

YUNG CHI PAINT & VARNISH MFG CO LTD R14635
26 YEN HAI 3RD RD, KAOHSIUNG TAIWAN

Types F-1, F-100 cementitious mixtures.

	Applied to Inorganic Reinforced Cement Board in a Maximum Thickness of 1/2 in.
Flame spread	5
Smoke developed	0

Coating Materials (BMCZ)

Coating materials intended for application to building surfaces are divided into two categories: (1) Coatings, Fire Retardant, intended for application to interior combustible surfaces (and occasionally interior noncombustible surfaces) for the purpose of reducing the surface burning characteristics, a (2) Coatings, General Purpose, intended for various purposes. The purpose the classification is to express the degree of surface burning characteristics the coating.

The flash points (closed cup) of the fire retardant and general purpose coatings (including preliminary and overcoatings) appear in the individual classifications. The publication of the flash point data is not intended to establish a flammability classification of the liquid coatings, but to indicate the flashing characteristics of the liquid coatings under a standard test procedure. Where "no flash" is indicated, the coating has no flash point in the closed cup tester.

Coatings, Fire Retardant (BMQX)

Coating materials are Classified as to their surface burning characteristics as applied to the specific interior surfaces and at the specific coverage rates indicated in the individual Classifications. The flash points (closed cup method) of the coatings are also indicated in the individual Classifications. The toxicity of the products of combustion and other properties have not been investigated.

To be eligible for Classification, the surface coating or coating system must reduce the flame spread of Douglas fir and all other tested interior combustible surfaces (having flame spreads of 100 or greater by test) to which it is applied at least 50 percent or to a flame spread Classification value of 50 or less, whichever is the lesser spread of flame. A coating or coating system may be Classified as applied to other surfaces (having flame spreads of less than 100 by test) after its eligibility as a fire retardant coating or coating system has been established as applied to Douglas fir, with the requirement that the flame spread Classification must not exceed a value of 50 to be eligible for Classification.

The surface burning characteristics are applicable only when the coating is applied at the rates of coverage and to the type or kind of surfaces indicated, when the coating is applied in accordance with the directions supplied with the container, and when the coating is maintained.

The Classifications are confined to the materials themselves and do not pertain to the structures on which the materials are installed.

Typical combustible surfaces indicated in the individual Classifications are Douglas fir, cellulose acoustical tile, cellulose board, and oriented strand boa (OSB). The Douglas fir substrates consist of nominal 1 by 4 in. finishe tongue-and-groove flooring. (The flame spread of the uncoated Douglas fir is 70-100).

The cellulose acoustical tile substrates consist of nominal 12- by 12- by 1/2 in. tongue-and-groove "Factory Finish" (starch type) perforated tiles. (The flame spread of the cellulose tile substrates is normally in excess of 150).

Coatings, Fire Retardant (BMQX)—*Continued*

The cellulose board substrates consist of nominal 10- by 48- by 1/2 in. square edge "Factory Finish" (starch type) unperforated boards. (The flame spread of the cellulose board is normally in excess of 75).

The oriented strand board substrates consist of a nominal 3/4 in. thick 24 in. wide by 96 in. long board (The flame spread of the oriented strand board is normally in excess of 150).

Unless otherwise indicated in the individual Classifications, cellulose board and cellulose tile substrates are supported for the tests attached to wood furring strips.

Typical noncombustible surfaces indicated in the individual Classifications are 1/4 in. thick inorganic reinforced cement board (flame spread 0) and gypsum wallboard (flame spread 15).

The useful life of these coating materials has not been investigated; however, it is of paramount importance that the coatings be maintained for continued effectiveness.

Fire retardant coatings may be tinted in the field provided compatible tints are used in a proportion not exceeding 2 oz of tint per gal of coating. Deeper shades may or may not be supplied by the individual manufacturers.

Authorities having jurisdiction should be consulted before application.

The basic standard used to investigate products in this category is UL 723 "Test for Surface Burning Characteristics of Building Materials".

LOOK FOR CLASSIFICATION MARKING ON PRODUCT

The Classification Marking of Underwriters Laboratories Inc. (shown below) on the product is the only method provided by Underwriters Laboratories Inc. to identify Fire Retardant Coatings which have been produced under its Classification and Follow-Up Service.

UNDERWRITERS LABORATORIES INC.
CLASSIFIED
FIRE RETARDANT COATING
SURFACE BURNING CHARACTERISTICS
+

+—The Classification Marking includes the flame spread and smoke developed values applicable to the product.

The Classification Marking of Underwriters Laboratories Inc. (shown below) on the Preliminary or Over Coating is the only method provided by Underwriters Laboratories Inc. to identify Preliminary or Over Coatings which have been produced under its Classification and Follow-Up Service.

UNDERWRITERS LABORATORIES INC.
CLASSIFIED
________ * ________ COATING
TO BE USED WITH (MANUFACTURER'S NAME AND PRODUCT DESIGNATION) FIRE RETARDANT COATING(S) IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS TO PRODUCE FINISHED CLASSIFIED SYSTEMS. FOR RESPECTIVE UL CLASSIFICATIONS, SEE THE FIRE RETARDANT COATING LABEL.
*PRELIMINARY OR OVER.

ALBI MFG, DIV OF STANCHEM INC R2810
401 BERLIN ST, EAST BERLIN CT 06023

Fire-Retardant Coating Surface	Type 107A Douglas Fir	Type 107A Douglas Fir	Type107A Douglas Fir	Type 107A Douglas Fir	Type 107A Douglas Fir
Flame spread	20	15	10	15	15
Smoke developed	0-5	5	5	5	5
Number of preliminary coats	None	None	None	None	None
Rate per coat (Sq ft per gal)	—	—	—	—	—
Number of fire-retardant coats	1	1	2	2	1
Rate per coat (Sq ft per gal)	175	150	200	200	150
Number of overcoats	None	None	None	1*	1*
Rate per coat (Sq ft per gal)	—	—	—	450	450

Flash point of liquid coating:
Fire-retardant coating: Type 107A: Closed cup, 100 F (37.8 C)
Overcoating Type 144: Closed cup: 106 F (41.2 C)
*Manufacturer's Type 144.

Fire-Retardant Coating Surface	Type 107A Douglas Fir	Type 107A Cellulose Tile
Flame spread	10	15
Smoke developed	5	5-10
Number of preliminary coats		
Rate per coat	None	None
(Sq ft per gal)		
Number of fire-retardant coats	—	—
Rate per coat	2	1
(Sq ft per gal)		
Number of overcoats	175	150
Rate per coat	None	None
(Sq ft per gal)	—	—

Flash point of liquid coating:
Fire-retardant coating: Type 107A: Closed cup, 100 F (37.8 C)

Fire-Retardant Coating Surface	Type ALBI COTE FRL Douglas Fir	Type ALBI COTE FRL Douglas Fir
Flame spread	25	20
Smoke developed	15	30
Number of preliminary coats		
Rate per coat	None	None
(Sq ft per gal)	—	—
Number of fire-retardant coats	1	1
Rate per coat (Sq ft per gal)	175	150
Number of overcoats	None	1*
Rate per coat (Sq ft per gal)	—	500

*Overcoating: ALBI-COTE TC.

AMERICAN UNI-TECH INC R14668
SUITE 240 19100 VON KARMAN, IRVINE CA 92715

Fire Retardant Coating Surface	Fire Screen Douglas Fir
Flame Spread	35
Smoke Developed	60
Number of preliminary coats	None
Rate per coat (sq ft per gal)	—
Number of fire retardant coats	1
Rate per coat (sq ft per gal)	200
Number of over coats	None
Rate per coat (sq ft per gal)	—

Flash point of liquid coating:
Fire-retardant coating Closed cup no flash to boiling.

AMERICAN VAMAG CO INC R4787
1061 LINDEN AVE, RIDGEFIELD NJ 07657

Surface	Type DS-II Douglas Fir	Type DS-II Cellulose Board
Flame spread	10	10
Smoke developed	30	20
Number of preliminary coats	None	None
Rate per coat (Sq ft per gal)	—	—
Number of fire-retardant coats	2	2
Rate per coat (Sq ft per gal)	200	200
Number of overcoats	None	None
Rate per coat (Sq ft per gal)	—	—

Flash point of liquid coating:
Fire retardant coating: Closed cup, no flash

Surface	Type PR-Clear Douglas Fir
Flame spread	5
Smoke developed	0
Number of preliminary coats	None
Rate per coat (Sq ft per gal)	—
Number of fire-retardant coats	2
Rate per coat (Sq ft per gal)	200
Number of overcoats	None
Rate per coat (Sq ft per gal)	—

Flash point of liquid coating:
Fire retardant coating: Closed cup, no flash

Surface	Type PR-White Douglas Fir	Type PR-White Cellulose Tile
Flame spread	5	5
Smoke developed	0	0
Number of preliminary coats	None	None
Rate per coat (Sq ft per gal)	—	—
Number of fire-retardant coats	2	2

Celebrating 150 Years
ZINSSER 1849-1999

Wm. Zinsser & Co., Inc.
173 Belmont Drive • Somerset, NJ 08875-1285 • 732-469-8100 • FAX 732-469-4539

July 21, 1999

Jim Nyarady
Manager, Strategy Evaluation Section
Stationary Source Division
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, CA 95812

Subject: Comments to Suggested Control Measure for Architectural Coating

Dear Mr. Nyarady:

William Zinsser & Company, Inc., a shellac and specialty primer manufacturer has a 150-year reputation of producing quality products for both professional and "do-it-yourself" customers. Zinsser is the world's largest manufacturer of shellac and as a result, we believe posses the most knowledge in this area. We are strongly opposed to the change in definition of shellac as proposed in the recent draft document, CARB Suggested Control Measure for Architectural Coatings, and think shellac should remain as a separate and distinct category.

13a-1 "LAC is the resinous secretion of the lac insect, parasitic on certain trees, principally in Bihar, Madhya Pradesh and other Indian states; also in Burma and Thailand. It is cultivated in these areas because of the commercial value of the lac resin.

SHELLAC is the refined form of lac. The word, derived from shell-lac, specifically refers to refined lac in thin flakes, the form in which it is most commonly marketed; but in general parlance the word shellac includes all forms of refined lac." *

Lac is the only known resin of animal origin (Merck Index and Kirk-Othmer Encyclopedia of Chemical Technology) and has been known in India and China for several thousand years. There are many other natural resins, including rosin (the residue left after distilling off the oils from oleoresin obtained from pine trees) and copal (a resin from fossil extrusions). However, shellac cannot be placed in the same classification with these resins because of its unique animal origin, acceptance as a safe, non-toxic protective coating for food, candy, fruit, pharmaceutical pills and children's toys, as well as quick-drying and stain sealing properties. Indeed, shellac even has its own distinct chemical abstracts (CAS) number, 9000-59-3.

13a-1 We believe that allowing other natural resins in this category would only lead to confusion in the industry and create a loophole for manufacturers to abuse this VOC category for architectural coatings. If the agency feels that other natural resins need to be included in this control measure, then a separate category should be added for this coating. Please consider these comments before finalizing your ruling.

* Excerpted from Shellac Handbook (Angelo Brothers Limited, 1965) enclosed with this letter.

Sincerely,

Michael L. Jurist
Director of Manufacturing

Enclosure

Celebrating 150 Years

Wm. Zinsser & Co., Inc.
173 Belmont Drive • Somerset, NJ 08875-1285 • 732-469-8100 • FAX 732-469-4539

ZINSSER 1849-1999

July 12, 1999

Mr. James Nyarady
Manager, Strategy Evaluation Section
Air Resources Board
2020L Street Box 2815
Sacramento, CA 95812

Dear Mr. Nyarady:

13b-1 In response to Dean Simeroth's letter of May 19,1999 and the Draft regulations that the Air Resources Board is proposing, I would like to comment on the proposed changes. I object to the proposed change in the definition of Shellac which would allow for other natural resins other than the resinous secretions of the lac beetle (Laccifer Lacca) to be placed in the category. Shellac is a unique natural resin that has been used as a protective coating for centuries, its exact start being lost in time. The term **Shellac** has always referred to a definite material (it has its own unique CAS # 9000-59-3) and the name denotes certain properties inherent to the product such as; quick drying and stain sealing properties. Allowing other natural resins in this class which do not have these characteristics can confuse and deceive the consumer into thinking they are getting a particular product and are in fact getting something quite different. It is important that the definition of "shellac" remain constant as it has throughout history.

The amount of Shellac products produced each year is limited by the fact that it is relatively expensive and the limited availability of the secretions of the lac beetle. Allowing other natural resins into this definition could greatly expand one the highest VOC categories. This can only lead to abuse. Why add a loophole to the VOC regulations?

As a suggestion, you may want to add a distinct Coating Category for "Other Naturally Occurring Resins" rather that changing the definition of a thousand years old natural resin. Why add confusion on the part of the consumer?

I strongly urge you to reconsider not changing the definition of the "Shellac Coatings Category." If you still feel there is a need to have a category for other natural resins, make it a separate one.

If you have any questions or wish to discuss this in further detail, please don't hesitate to call me at the above listed number.

Sincerely,

Arthur B. Paltz, Director
Zinsser Group Environmental Services

An RPM Company

Celebrating 150 Years

Wm. Zinsser & Co., Inc.
173 Belmont Drive • Somerset, NJ 08875-1285 • 732-469-8100 • FAX 732-469-4539

ZINSSER 1849-1999

July 9, 1999

Mr. Jim Nyarady, Manager Strategy Evaluation Section
Stationary Source Div.
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, CA 95812

Dear Nyarady:

In response to the recent letter from Mr. Peter D. Venturini, I passionately submit the following comments for consideration as CARB considers modifications to the suggested control measures for architectural coatings.

As the world's largest producer and most expert company in the "**SHELLAC**" industry, we want to implore CARB <u>not to modify the definition of shellac</u> in the current or future versions of air control measures as is currently being proposed.

13c-1

First, the Federal EPA has allowed the category of shellac to be reinterpreted, to become confused and to become a "loophole" for manufacturer's wishing to violate the spirit of the original CARB regulations put forth many years ago. During CARB's earliest efforts to exempt shellac-based products from stringent regulations, your group wisely chose to limit the shellac definition to the resinous secretion of the lac bug. By so limiting this category, CARB effectively limited the opportunity for this category to be a loophole through which a broader list of products and a longer list of applications would be possible. CARB should maintain the more restricted shellac definition which, in effect, solves the fundamental problem by allowing a truly effective unique natural product to be available for use in its special applications without extending the category to include other natural resins soluble in alcohol. These non-"shellac" resins are more readily available and are available at lower cost which in effect gives the marketplace additional opportunities to create allowed VOC generating products. While shellac is readily available to any manufacturer who wishes to formulate with this unique all natural resin, the more restrictive definition achieves all the benefits industry needs and achieves the restricted VOC goals as well.

Secondly, non-shellac natural resins do not perform in the same unique way as shellac and are therefore of no value as VOC allowed alternative. Only shellac seals odors. Only shellac seals in knots. Only shellac seals in tannin bleed and

An RPM Company

other solvent soluble stains. There is no reason to expand the shellac category to include other resins.

Third, shellac is, by definition, a specific identifiable chemical commodity. By calling any natural resin "shellac", you will confuse the fundamental daily use of the word "shellac". If CARB truly wants to create a category wherein all natural resins that are soluble in alcohol are allowable, then please do not call the category "shellac". We strongly suggest you rename any such category "alcohol soluble natural resin coatings". This is more correct and will prevent substantial confusion in advertising copy, literature and other commonplace references to generally understood industry parlance. Shellac is shellac and the term need not be redefined by CARB or the USEPA.

13c-1 Shellac-based products have only limited application and limited real world need. Already available alternative products, which are much lower in VOC, are available at lower cost and are easier to use thereby making shellac a perfect category for unique status with minimal VOC impact. Shellac is ideal as an odor barrier, as a stain sealer, as a knot sealer, as a child-safe natural finish, as a migrating tannin blocker and as a fast drying bond coat. Shellac-based products are available in multiple sizes including aerosol thereby making this category an ideal vehicle for consumer and professional users to solve real world challenges with a specialty category that has, in total, the reality of generating only modest levels of VOC.

If CARB takes a strong position on this issue, I suspect it will be easier to convince the USEPA that their recent adoption of a modified definition for shellac should be reversed or revisited as well. We sincerely appreciate the leadership that CARB has shown in this area in the past and look forward to wisdom again prevailing in your upcoming revisions.

Sincerely,

Robert Senior

Robert Senior
President

RS/gg

Zehrung Brands

Division of Wm. Zinsser & Co., Inc.
173 Belmont Drive • Somerset, NJ 08875-1285
Telephone (732) 469-8100
FAX (732) 469-4539

July 15, 1999

Mr. Jim Nyarady
Manager
Strategy Evaluation Section, Stationary Source Div.
PO Box 2815
Sacramento, CA 95812

Dear Mr. Nyarady:

I am writing you today in reference to CCR, Title 14, §§ 15082(a), 15103, and 15375. Specifically, I would like to address the proposed change to the SCM for Architectural Coatings, *Definitions, 2.34, Shellac.*

The old rule specified that, in order to comply with the relatively high VOC levels afforded natural shellac, coatings must be *formulated solely with the resinous secretions of the lac beetle (Laccifer lacca), thinned with alcohol and formulated to dry by evaporation . . . .*

The new proposed rule, *Draft 6/10/99*, alters the definition significantly by expanding the category to include *natural resins . . . soluble in alcohol **(including, but not limited to,** the resinous secretions of the lac beetle . . .) . . . .*

14-1 This change will, in my opinion, result in a number of unintended consequences, all of which will certainly increase the amount of VOC emissions, both near and long term.

Here's why: the new definition will not only allow but probably encourage manufacturers to begin marketing alcohol-based coatings they'll call "shellac," but will in-fact be formulated using natural gum copals or rosin ester resins. It won't be long before the marketplace is flooded with these shellac substitutes.

This is an easily predictable response, as this strategy will be viewed by the industry as a logical, and perfectly legal, method of circumventing the ever more restrictive VOC limits being placed on "Primers, Sealers, and Undercoaters." This new category and these newly allowed "shellac substitute" coatings will be sold and used primarily as either general purpose or quick-dry, stain-blocking, white pigmented primers, sealers, and undercoaters. And they'll be perfectly legal at 550 g/l VOC vs. 350 (current), then 200 (2002), and finally 100 (2006) g/l VOC allowed most oil or alkyd based primers in use now.

The logical question for you to ask at this point Under the current regulations, with the shellac definition restricted to coatings formulated with pure shellac (Laccifer lacca resin) only, is shellac's share of the overall primer market increasing as a result of the more restrictive VOC controls on other primers?

14-2 Good question, and I'm glad you asked. The answer is no. And in the case of Zehrung, our shellac based products continue to decline as a % of our overall primer sales in California and elsewhere.

But I firmly believe, and think it totally predictable, that if the new shellac definition becomes law, 550 g/l VOC alcohol-based non-shellac primers will begin to displace the more commonly used solvent-based alkyd formulations.

Now the logical question for you to ask is: Why? Why, if the new shellac definition becomes law, will the non-shellac "shellacs" represent a larger % of total primer sales, and VOC emissions, than has been the case by restricting the old definition to pure shellac (Laccifer lacca) resin?

There are two reasons really, and they are directly related:

- Pure shellac formulations exhibit unique characteristics.
- Pure shellac formulations are expensive.

14-3 A few of shellac's unique characteristics include unsurpassed adhesion to difficult surfaces, non-toxic film, the best stain sealer available, very fast drying, pet and smoke odor control, etc. But crude shellac is only available from Thailand and India, requires extensive processing and special handling and storage, and is therefore very expensive.

As a result, pure shellac-based primers are specified and used only when their unique characteristics are worth spending the extra money. Consider this – a gallon of a typical, alkyd-based white primer usually costs the user $10.00 - $15.00 per gallon, depending on the brand, where purchased, etc. A gallon of white pigmented shellac will typically cost the user $20.00 - $30.00 per gallon, again depending on the brand and where it was purchased. That's a huge difference and the reason that, under the old SCM definition, shellac-based coatings' share of the overall primer market hasn't increased.

For most general purpose priming, a water-based or an inexpensive alkyd-based primer will suffice, and may even be preferable. Only rarely, and for very specific problems, is a pure shellac-based primer worth the additional expense to the end-user.

14-3

But the new "shellac" definition as proposed in the Draft SCM will significantly change the dynamic I have just outlined. That's because the other alcohol soluble resins – gum copals and rosin esters – are cheap. These formulations will be inexpensive to manufacture and market, and their new found status and ready availability when the new regs go into effect will, I believe, result in significant additional VOC emissions.

Allowing what amounts to a new category of inexpensive, alcohol-based, high VOC primers into the market by virtue of changing the old definition of shellac represents a huge and significant loophole in the ARB's attempt to decrease the VOC emissions attributable to primers, sealers, and undercoaters.

14-4

Accordingly, I believe the ARB should reconsider the new "shellac" definition contained in the 6/10/99 Draft SCM proposal. Specifically, I think the original wording defining shellac as *coatings formulated solely with the resinous secretions of the lac beetle (Laccifer lacca), thinned with alcohol . . .* should be restored.

14-5

This is obviously a selfish and somewhat self-serving request, based on the fact that Zehrung is in the specialty primer manufacturing business, and that we are one of the few companies that still bothers to make and sell pure shellac-based products. My motive in asking you to reconsider is not as it may first appear, however.

My real concern is not the potential for increased competitive activity. We, after all, can and will introduce an alcohol-based shellac substitute if that's what the market wants. You may recall that years ago Zehrung marketed just such a product, called Z-Lac, and *it was one of our best selling products in CA prior to it's being outlawed by the new VOC regs* that went into effect in the late 80's. Now we'll have to consider re-introducing it.

Anyway, my real concern is that not too long after these new regs take effect, the reporting requirements will reveal that massive (and unexpected?) quantities of 550 g/l VOC primers are being sold. There will then be a move to either restrict the allowable VOC content of alcohol-based primers, or the "shellac" category will be eliminated entirely.

Both of these scenarios are problematic. White pigmented shellac cannot be formulated below 550 g/l VOC, and pure shellac-based products really are unique. Pure shellac coatings shouldn't be outlawed in the future on the basis that the newly created category of non-shellac "shellacs" constitutes a significant source of VOC emissions, directly as a result of what I believe is the unwarranted and unwise decision to change the shellac definition in the new SCM.

14-6 Finally, and this has just occurred to me, I am curious as to whether or not counsel for the Board has explored the ramifications of mandating label wording, in this case requiring a category of products be labeled or identified as "shellac," when in fact the products don't have to actually contain any shellac? This may be the equivalent of enacting a law requiring that red wine be labeled "Cabernet" when in reality the wine can be formulated solely with Merlot grapes if the winemaker so chooses. This issue strikes me as a terribly complicating factor in-as-much as I suspect that requiring a manufacturer to label a product as "shellac" when it's really not shellac may potentially violate a host of state and federal labeling laws. I would appreciate understanding the Board's thinking regarding this specific issue.

Thank you in advance for your courtesy in exploring the important issues I have raised in this comment letter, and sharing my concerns with the Board. If I may answer any questions, please feel free to call or e-mail: 323-656-0798 or dougtobey@msn.com.

Sincerely,

7/19/99

Douglas Tobey

Cc: Bob Senior
Dick Stevens

AKZO NOBEL

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Reliance

6-23-99

coating that is formulated and recommended for application to
limited to, decks, porches, and steps, for the purposes of

ompound: A coating formulated and recommended for application 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.

2.16 Graphic Arts Coating or Sign Paint: A coating formulated and recommended for hand-application 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.

2.17 High-Temperature Coating: A high performance coating formulated, recommended, and used for application to substrates exposed continuously or intermittently to temperatures above 204°C (400°F).

2.18 Industrial Maintenance Coating: A high performance architectural coating, including primers, sealers, undercoaters, intermediate coats, and topcoats, formulated and recommended for application to substrates exposed to one or more of the following extreme environmental conditions listed in subsections 2.18.1 through 2.18.5 in an industrial, commercial, or institutional setting :

- 2.18.1 Immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;
- 2.18.2 Acute or chronic exposure to corrosive, caustic or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;
- 2.18.3 Repeated exposure to temperatures above 121°C (250°F);
- 2.18.4 Repeated (frequent) heavy abrasion, including mechanical wear and repeated (frequent) scrubbing with industrial solvents, cleansers, or scouring agents; or
- 2.18.5 Exterior exposure of metal structures and structural components.

2.19 Lacquer: A clear or opaque wood coating, including clear lacquer sanding sealers, formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and to provide a solid, protective film. Lacquer stains are considered stains, not lacquers.

15-1 2.20 Low Solids Coating: A coating containing 0.12 kilogram or less of solids per liter (1 pound or less of solids per gallon) of coating material and for which at least half of the volatile component is water.

2.21 Magnesite Cement Coating: A coating formulated and recommended for application to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

by weight or volume?

2.22 Mastic Texture Coating: A coating formulated and recommended to cover holes and minor cracks and to conceal surface irregularities, and is applied in a single coat of at least 10 mils (0.010 inch) dry film thickness.

2.23 Metallic Pigmented Coating: A coating containing at least 48 grams of elemental metallic pigment per liter of coating as applied (0.4 pounds per gallon), excluding zinc.

2.24 Multi-Color Coating: A coating that is packaged in a single container and exhibits more than one color when applied.

2.25 Nonflat Coating: A coating that is not defined under any other definition in this rule and that registers a gloss of 15 or greater on an 85-degree meter or 5 or greater on a 60-degree meter according to ASTM Designation D 523-89, Standard Test Method for Specular Gloss (incorporated by reference--see section 5.).

2.26 Pre-treatment Wash Primer: A primer that contains a minimum of 0.5 percent acid, by weight, that is formulated and recommended for application directly to bare metal surfaces to provide corrosion resistance and to promote adhesion of subsequent topcoats.

2.27 Primer: A coating formulated and recommended for application to a substrate to provide a firm bond between the substrate and subsequent coats.

2.28 Quick-Dry Enamel: A nonflat coating that has the following characteristics:
 2.28.1 Is capable of being applied directly from the container under normal conditions with ambient temperatures between 16 and 27°C (60 and 80°F);
 2.28.2 When tested in accordance with ASTM Designation D 1640-83 (Reapproved 1989), Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature (incorporated by reference--see section 5.), sets to touch in 2 hours or less, is tack free in 4 hours or less, and dries hard in 8 hours or less by the mechanical test method; and
 2.28.3 Has a dried film gloss of 70 or above on a 60 degree meter.

2.29 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.

2.30 Roof Coating: A coating formulated and recommended 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.

2.31 Rust Preventative Coating: A coating formulated and recommended for use in preventing the corrosion of ferrous metal surfaces in residential situations.

2.32 Sanding Sealer: A clear wood coating formulated and recommended for application to bare wood to seal the wood and to provide a coat that can be sanded to create a smooth surface. A sanding sealer that also meets the definition of a lacquer is not included in this category, but is included in the lacquer category.

2.33 Sealer: A coating formulated and recommended for application to a substrate for one or more of the following purposes: to prevent subsequent coatings from being absorbed by the substrate; to prevent harm to subsequent coatings by materials in the substrate; to block stains, odors, or efflorescence; to seal fire, smoke, or water damage; or to condition chalky surfaces.

2.34 Shellac: A clear or opaque coating formulated with natural resins (except nitrocellulose resins) soluble in alcohol (including, but not limited to, the resinous secretions of the lac beetle, Laciffer lacca). Shellacs dry by evaporation without chemical reaction and provide a quick-drying, solid protective film that may be used for blocking stains.

2.35 Solicit: To require for use or to specify, by written or oral contract.

2.36 Shop Application: A coating is applied to a product or a component of a product in a factory or shop as part of a manufacturing, production, or repairing process (e.g., original equipment manufacturing coatings).

2.37 Stain: A coating formulated to change the color of a surface but not conceal the surface. This includes lacquer stains.

2.38 Swimming Pool Coating: A coating formulated and recommended to coat the interior of swimming pools and to resist swimming pool chemicals.

2.39 Tint Base: A coating to which colorant is added in a paint store or at the site of application to produce a desired color.

2.40 Traffic Marking Coating: A coating formulated and recommended for marking and striping streets, highways, or other traffic surfaces including, but not limited to, curbs, berms, driveways, parking lots, sidewalks, and airport runways.

2.41 Undercoater: A coating formulated and recommended to provide a smooth surface for subsequent coatings.

2.42 Varnish: A clear or semi-transparent coating, excluding lacquers and shellacs, formulated and recommended to provide a durable, solid, protective film. Varnishes may contain small amounts of pigment to color a surface, or to control the final sheen or gloss of the finish.

2.43 Volatile Organic Compound (VOC): Any compound of carbon, which may be emitted to the atmosphere during the application of and or subsequent drying or curing of coatings subject to this rule, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, and excluding the following:

2.43.1 methane;
methylene chloride (dichloromethane);
1,1,1-trichloroethane (methyl chloroform);
trichlorofluoromethane (CFC-11);
dichlorodifluoromethane (CFC-12);
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113);
1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114);
chloropentafluoroethane (CFC-115);
chlorodifluoromethane (HCFC-22);
1,1,1-trifluoro-2,2-dichloroethane (HCFC-123);
2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124);
1,1-dichloro-1-fluoroethane (HCFC-141b);
1-chloro-1,1-difluoroethane (HCFC-142b);
trifluoromethane (HFC-23);
pentafluoroethane (HFC-125);
1,1,2,2-tetrafluoroethane (HFC-134);
1,1,1,2-tetrafluoroethane (HFC-134a);
1,1,1-trifluoroethane (HFC-143a);
1,1-difluoroethane (HFC-152a);
cyclic, branched, or linear completely methylated siloxanes;
the following classes of perfluorocarbons:
    (A) cyclic, branched, or linear, completely fluorinated alkanes;
    (B) cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;
    (C) cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and
    (D) sulfur-containing perfluorocarbons with no unsaturations and with the sulfur bonds only to carbon and fluorine; and

15-2 [- include methyl acetate]

2.43.2 the following low-reactive organic componds which have been exempted by the U.S. EPA:
    acetone;
    ethane; and
    parachlorobenzotrifluoride (1-chloro-4-trifluoromethyl benzene).

2.44 VOC Content: The weight of VOC per volume of coating, calculated according to the procedures in subsection 5.1.

2.45 Waterproofing Wood Sealer: A coating formulated and recommended for application to a wood substrate for the primary purpose of preventing the penetration of water.

2.46 Waterproofing Concrete/Masonry Sealer: A clear or pigmented coating that is formulated for sealing concrete and masonry to provide resistance against water, alkalis, acids, ultraviolet light, and staining.

TRU★SERV®

July 15, 1999

Mr. Jim Nyarady, Manager Stationary Source Division
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, CA 95812

Dear Mr. Nyarady:

Re: Comments on the Draft Environmental Impact Report and Suggested Control Measures

16-1 TruServ Mfg. Manufactures paints and coatings for True Value, ServiStar and Coast to Coast Hardware stores. The proposed draft environmental impact report and the subsequent suggested control measures causes us great concern.

We understand the need for continued air emissions control in the state, but by doing it in this manner, you may be creating more problems than you solve. As with the South Coast rule, the decision this for rule making is being made on incomplete and inaccurate information. It is critical that more consideration be given this process before its passage.

16-2 Inaccuracies were pointed out in part in the second meeting when the preliminary draft of the VOC Emissions Survey was presented. There were obvious errors made in reporting the VOC content of some of the coatings as discussed at the June 3 meeting, and further reviewed from the draft ingredient data supplied by your office. The values should be reviewed before taking them as fact, especially if some of the VOC limits are being drawn solely from this information.

16-3 In a review of your draft EIR, several inadequacies surface. Most of the alternatives for compliance are unusable. As shown in the July 1, 1999 meeting, almost no manufacturers can use the averaging provision. The low vapor pressure exemption and reactivity have no benefit for the 2002 standards, and will very likely have no benefit in 2006. The seasonal approach would be a logistical nightmare for our members and us.

16-4 It is a fact that paint is used partially for decorative purposes, but more importantly, it is used to protect substrates from dirt, weathering, mildew, and general degradation. It has been said more than once by painting contractors attending these workshops that coatings at the current VOC limits exhibit marginal performance. What will lower VOC's bring? We don't know, because we won't have adequate time to reformulate and test performance characteristics of the reduced VOC products.

16-5 In chapter 2, Section VI, Transportation/Circulation of the draft EIR, you state the draft SCM "will not result in a substantial increase in vehicle trips throughout the state....", but you fail to consider, the makeup of the traffic could very likely be affected. The NTS study showed that low VOC consumer products, such as the category of nonflat paint, are not freeze-thaw stable. It is not an issue within the state, but it is an issue for those manufacturers that have to deliver it to California. This could cause an increase in traffic during the already high ozone periods because these products could only be shipped during three seasons, to avoid potential freezing en route.

16-6 In closing, we ask that you consider four things.

1. Adding more categories to the rule, such as the nonflats to include several gloss limits, interior and exterior, and adjust those limits accordingly.
2. Push out the 2002 limit to 2004 to allow more time for reformulation and evaluation of new products.
3. Drop the 2006 limits completely, and if necessary, revisit those limits at a later date.
4. Extend the presentation of the SCM for Architectural Coatings to ARB until June 2000.

Thank you for your consideration of these comments. If you have any questions, please contact me.

Sincerely,

Marcella Nichol

Marcella Nichols, CHMM
Regulatory Compliance Mgr.

cc: B. Simmons
D. Vermilya
D. Patrizi
E. Majkrzak

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

July 7, 1999

Mr. Dean C. Simeroth, Chief
Criteria Pollutants Branch
Stationary Source Division
Air Resources Board
2020 "L" Street
P. O. Box 2815
Sacramento, California 95812

Comments on the Suggested Control Measure for Architectural Coatings

Dear Mr. Simeroth:

The Metropolitan Water District of Southern California (Metropolitan) appreciates this opportunity to provide comments to the Air Resources Board (ARB) on the draft 6/10/99 proposed changes to the Suggested Control Measure for Architectural Coatings (SCM). Metropolitan has also met with ARB representatives (Don Ames, Jim Nyarady, Mike Jaczola) on June 23, 1999 to discuss the draft document. Metropolitan distributes wholesale water obtained from the Colorado River and Northern California to 27 member agencies (and indirectly to over 300 retail water agencies) and provides more than one-half of the water used by approximately 16 million persons in the 5,200 square-mile coastal plain of Southern California. To provide this service, Metropolitan operates an extensive system of water conveyances, reservoirs, and water treatment plants. The comments herein reflect Metropolitan's views and concerns as an affected agency.

17-1 Metropolitan is supportive of the efforts to reduce volatile organic compound (VOC) emissions from the application of architectural coatings. We recognize and appreciate ARB's efforts to harmonize the draft proposed SCM's provisions with existing related federal and regional regulations. In particular, Metropolitan is interested in more closely aligning the proposed SCM with the May 14, 1999 amendments to the South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings. As an end-user of architectural/industrial maintenance (AIM) coatings on critical components of the water delivery system, Metropolitan has concerns with respect to having sufficient time to identify and test the lower VOC AIM coatings to determine their adequacy to replace our existing approved coatings. The SCAQMD Rule 1113 addresses this time concern by identifying a contingency provision for "essential public services coatings" (EPSC). For the same reasons that such a provision was incorporated into Rule 1113, as well as for consistency, Metropolitan is requesting that an EPSC provision also be placed in the SCM. Metropolitan's specific concerns and recommendations are provided below.

Available Replacement Coatings

17-2 **Issue:** The draft proposed SCM includes the following: revised definition of "Industrial Maintenance Coatings"; and reduction of VOC limits in specific AIM categories, including Industrial Maintenance Coatings (from 340 g/l to 250 g/l, effective July 1, 2002, and from 250 g/l to 100 g/l effective July

17-2 1, 2006). While supportive of the goal to reduce VOC emissions, Metropolitan has concerns regarding the timely availability of the lower VOC containing compliant coatings which meet field needs. As an essential public service, Metropolitan has the responsibility to ensure the reliability and safety of the water delivery system, as well as to minimize the occurrence of potential service interruptions. A lack of coatings which have been demonstrated to perform comparably to existing products could conceivably result in the use of coatings which may not adequately protect and possibly result in accelerated damage to our public infrastructures (e.g., pipelines, water conveyance equipment, tanks, or bridges). Metropolitan utilizes approximately 10,600 gallons of architectural industrial maintenance coatings, statewide, per year.

17-3 Over the past thirty years, Metropolitan has established a rigorous performance testing program to evaluate all coatings and materials of construction prior to approval for use on Metropolitan's industrial structures. For a first generation coating to be accepted, the process involves two to three years of performance testing by Metropolitan's Engineering Division Materials and Metallurgy Section, followed by an additional three years of field testing in an actual field construction project. Therefore, as higher VOC containing non-compliant coatings are phased out, it can take as many as six years for any new compliant coatings to be demonstrated as suitable for a public water service. In fact, it has been our experience that 80 % of the coatings tested in our Corrosion Control Laboratory do not meet Metropolitan's performance standards and are rejected for poor performance reasons. Additionally, 75 % of the coatings tested do not meet the physical and performance characteristics stated in the manufacturer's technical product data sheets. To exemplify this, Attachment 1, the Table of Metropolitan Water District Coating Performance Testing Results, identifies five coatings that Metropolitan has tested and rejected for performance reasons. Attachment 2 is a summary of the American Society for Testing and Materials (ASTM) standardized test methods which Metropolitan currently runs on coatings and adhesives.

Specific information identifying the impacts that the proposed SCM VOC limits will have on Metropolitan's current critical coatings is provided in Attachment 3. As shown by this data, the proposed SCM VOC limits will have a severe impact on Metropolitan's approved critical coatings.

17-4 **Recommendation**: To provide adequate time for the identification and testing of lower VOC compliant coatings, Metropolitan recommends that similar to SCAQMD Rule 1113, a category be established for "essential public services coatings" with a continued VOC limit of 340 g/l, until July 1, 2006, when it would be subject to the same final VOC limit as the Industrial Maintenance Coating category . These coatings would be defined as, "protective (functional) coatings applied to components of power, municipal wastewater, water, bridges and other roadways". The EPSC VOC limits and effective dates would be: 340 g/l, date of adoption; 100 g/l, July 1, 2006 (adoption subject to the results of the scheduled SCAQMD technology assessments).

Again, by establishing these modified limits, adequate time would be provided to test the new coatings. Metropolitan is committed to phasing out the higher VOC coatings and is actively testing lower VOC (e.g., 100 g/l) materials. As soon as they pass, the lower VOC coatings will be incorporated into Metropolitan's operations as replacements for the comparable higher VOC coatings. We do not envision exercising the EPSC option unless necessary (e.g., suitable lower VOC coatings

17-4 cannot be identified). Additionally, as an Essential Public Service Agency, Metropolitan is committed to participating in the technical assessments with SCAQMD, as directed by the SCAQMD Board Resolution No. 99. We are prepared to meet with SCAQMD staff and other interested public agencies in the next few weeks to begin planning of the technical assessments. Through these technical assessments, an attempt will be made to accelerate the overall testing period, where feasible.

2) Available Repair Coatings

17-5 **Issue:** Currently, Metropolitan has structures that are coated with solvent borne coatings. Over time, these structures will require patch repair and maintenance using a compatible coating system. In order to maintain manufacturer warranty of the coating, the same solvent borne coating that was originally applied, or a repair coating approved by the manufacturer would need to be utilized. Once the proposed SCM becomes effective, these coatings may not meet the required VOC limits. The alternative to utilizing the original coating would be complete removal and recoating (primer, intermediate and topcoat) of the entire structure, which will result in release of a higher VOC volume overall.

17-6 **Recommendation:** The proposed EPSC category and modified VOC limit will help ameliorate this concern regarding touch-up and repairs of the existing higher VOC coatings. In addition, as discussed with SCAQMD staff, the cooperative public services technical assessment will include evaluation of the new coatings' compatibility with existing coatings.

Thank you again for the opportunity to comment on the draft proposed SCM and to meet with ARB representatives to discuss Metropolitan's concerns. Should you have any questions or wish to discuss Metropolitan's comments, please contact Ms. Carol Kaufman at (213) 217-6207.

Very truly yours,

John E. Clark

John E. Clark
Manager, Regulatory Affairs Branch

CYK/lov-R-99-146

cc: Donald J. Ames, P.E.
Assistant Chief

James E. Nyarady, P.E.
Manager, Strategy Evaluation Section

Michael P. Jaczola
Staff Engineer

Attachment 1

Table of Metropolitan Water District Coating Performance Testing Results
(Page 1 of 2)

Coating Type	Manufacturer's Description of Performance and Characteristics	VOC (g/l)	Substrate & Prep	Primer	Test Protocol	Test Duration	Evaluation Results	Remarks Regarding Coating Performance
# 101 Two Component Elastomeric Polyurethane Rubber Coating System	Outstanding abrasion resistance, tensile strength and hydrolytic stability	2.4 g/l	Concrete SSPC-7	Polyamide epoxy sealer	Immersion -Untreated Water ASTM D-870 (Modified)	23 months	Failure Mode: Severe color fade; surface cracking; osmotic blistering	Unacceptable: adhesion, color retention; & resistance to permeability
					Immersion -Demin. Water ASTM D-870 (Modified)	23 months	Failure Mode: Severe color fade; surface cracking; osmotic blistering	Unacceptable: adhesion, color retention; & resistance to permeability
					Immersion -Filtered Water ASTM D-870 (Modified)	23 months	Failure Mode: Severe color fade; surface cracking; osmotic blistering	Unacceptable: adhesion, color retention; & resistance to permeability
					Atmospheric ASTM G-7	18 months	Failure Mode: Severe discoloration	Unacceptable: color retention & resistance to weathering
			Steel Panel SSPC-5	Polyurethane primer	Immersion -Untreated Water ASTM D-870 (Modified)	27 months	Failure Mode: Moderate color fade; surface cracking; osmotic blistering, disbonding	Unacceptable: adhesion, poor color retention; & resistance to permeability
					Immersion -Filtered Water ASTM D-870 (Modified)	27 months	Failure Mode: Moderate color fade; surface cracking; osmotic blistering, disbonding	Unacceptable: adhesion, poor color retention; & resistance to permeability
					Immersion -Finished Water ASTM D-870 (Modified)	22 months	Failure Mode: Moderate color fade; surface cracking; osmotic blistering, surface deterioration & disbonding	Unacceptable: adhesion, poor color retention; & resistance to permeability
					Atmospheric ASTM G-7 (Modified)	21 months	Failure Mode: Moderate discoloration; surface etching; surface cracking/checking	Unacceptable: color retention & resistance to weathering
					High Humidity ASTM D-2247 (Modified)	4 months	Failure Mode: Heavy rust formation at X, rust formation at edge radii	Unacceptable: resistance to moisture permeability
					Cathodic Disbonding ASTM G-8 (Modified)	4 months	Polarization established - coating in good condition	Coating passed 120 day exposure CDT test
#102 Two component water based epoxy coating	High performance exterior industrial maintenance enamel. Chemical, abrasion, & impact resistance	176	Steel Panel SSPC-5 (abrasive blasted)	Zinc rich water based epoxy	Atmospheric ASTM G-7 (Modified)	17 months	Failure Mode: Moderate discoloration, loss of 50% gloss	Unacceptable: gloss and color retention & resistance to weathering
					Weatherometer. ASTM D-2565 (Modified)	1600 Hours	Failure Mode: surface etching, moderate darkening, small osmotic blisters, 50 loss of gloss	Unacceptable: gloss and color retention, resistance to weathering permeability
				Catalyzed epoxy	Atmospheric ASTM G-7 (Modified)	17 months	Failure Mode: Moderate discoloration, loss of 40% gloss	Unacceptable: gloss and color retention & resistance to weathering
					High Humidity ASTM D-2247 (Modified)	4 months	Failure Mode: rust formation at X, rust formation at edge radii, small osmotic blisters	Unacceptable: adhesion and resistance to moisture permeability & color retention
					Weatherometer ASTM D-2565 (Modified)	1600 Hours	Failure Mode: surface etching, mod. darkening, small osmotic blisters, 63% loss of gloss	Unacceptable: gloss and color retention, resistance to weathering
				DTM acrylic gloss primer	Atmospheric ASTM G-7 (Modified)	17 months	Failure Mode: Moderate discoloration, loss of 30% gloss	Unacceptable: gloss and color retention & resistance to weathering

Attachment I

Metropolitan Water District Coating Performance Testing Results
(Page 2 of 2)

Coating Type	Manufacturer's Description of Performance and Characteristics	VOC (g/l)	Substrate & Prep	Primer	Test Protocol	Duration	Evaluation Results	Remarks Regarding Coating Performance
# 103 Water reducible, 100% acrylic gloss coating (DTM).	Corrosion resistant coating, excelent moisture resistance, excellent exterior durability	208 g/l	Steel Panel SSPC-5	DTM	Atmospheric ASTM G-7	17 months	Failure Mode: moderate discoloration, . acceptable gloss retention, tiny rust spots.	Unacceptable: color retention & resistance to weathering.
					Weatherometer ASTM D-2565 (Modified)	1600 Hours	Failure Mode: slight darkening, 5% loss of gloss	Acceptable: gloss and color retention, & acceptable resistance to weathering.
					High Humidity ASTM D-2247 (Modified)	4 months	Failure Mode: heavy rust formation at X, moderate rust formation all surfaces, osmotic blistering.	Unacceptable: adhesion & resistance to moisture permeability
			Steel Panel SSPC-5	Oil primer	Weatherometer ASTM D-2565 (Modified)	1600 Hours	Failure Mode; moderate darkening blisters, 5% loss of gloss	Acceptable gloss and color retention
					Atmospheric ASTM G-7 (Modified)	19 months	Failure Mode: slight discoloration; 16% loss of gloss.	Acceptable color retention & acceptable resistance to weathering
					Cathodic Disbonding ASTM G-8 (Modified)	4 months	Polarization established - coating in good condition	Coating passed 120 day exposure CDT test
#104 100% solids aromatic elastomeric urethane coating	Coating is designed for immersion in potable water, salt water, and aqueous chemical solutions	0	Concrete SSPC-7 And Steel Panel SSSPC -5	Epoxy Primer	Immersion -Untreated Water ASTM D-870 (Modified)	25 months	Failure Mode: severe darkening;	Unacceptable: color retention.
					Immersion -Filtered Water ASTM D-870 (Modified)	25 months	Failure Mode: severe darkening	Unacceptable: color retention.
					Immersion -Finished Water ASTM D-870 (Modified)	25 months	Failure Mode: severe darkening; surface deterioration; osmotic blistering	Unacceptable: adhesion, color retention; resistance to moisture permeability & chemical exposure.
					High Humidity ASTM D-2247 (Modified)	4 months	Coating in good condition	Acceptable short term resistance to moisture permeability.
			Steel Panel SSPC-5		Cathodic Disbonding ASTM G-8 (Modified)	4 months	Polarization established, however coating developed osmotic blisters and delamination from substrate.	Unacceptable: adhesion, resistance to moisture permeability, & failed CDT test (ASTM G-8)
					Cavitation Test Chamber - stability under conditions of high velocity water flow.	24 hours	Failure Mode: Coating delaminated from substrate.	Coating exhibited unacceptable stability under conditions of high water flow.
# 105 Acrylic primer coating	Premium anti-corrosion industrial maintenance primer for interior and exterior metal surfaces,.	250	Steel Panel SSPC-5	DTM	Atmospheric ASTM G-7	20 months	Failure Mode: moderate discoloration, extensive rust formation.	Unacceptable: color retention, & resistance to weathering.
					High Humidity ASTM D-2247 (Modified)	4 months	Coating formed osmotic blisters, extensive rust spots, moderate darkening.	Unacceptable: color retention, resistance to weathering, & unacceptable resistance to moisture permeability

ATTACHMENT 2

MWD TESTING USING ASTM PROCEDURES

TEST VENUE		ASTM STANDARD
• **Immersion in:**	**Finished water**	ASTM D-870 (87) Modified
	Filtered water	ASTM D-870 (87) Modified
	Raw water	ASTM D-870 (87) Modified
• **Softened Water: (Zero water)**		ASTM D-870 (87) Modified
• **Cathodic Disbonding: (Water)**		ASTM G-8 (79)
• **Cathodic Disbonding: (Soil)**		ASTM G-19 (88)
• **Abrasion Test. Taber Abraser Method:**		ASTM D-4060 (90)
• **Accelerated Weatherometer:**		ASTM D-2565 (89) Modified
• **Cavitation Test:**		None applicable
• **High Humidity:**		ASTM D-2247 (87) & ASTM B-117 (90) Modified
• **KTA Envirotest:**		ASTM D-2246 (87) Modified
• **Atmospheric Weathering:**		ASTM G-7 (89) Modified
• **Slant Shear Test:**		ASTM C-882 (91) Modified
• **Adhesion Test:**		ASTM D-4541 (85)
• **Spectroscopic Analysis of Coatings:**		ASTM E-932 (89)
• **Wet To Dry Hiding Change (Spread Cards):**		ASTM D-5007 (89) Modified
• **Physical Analyses of Coatings Including:**		
Solids by Wt.		ASTM D-2369 (90) Modified
Solids by Vol.		ASTM D-2697 (86) & ASTM D-2832 (91) Modified
Viscosity		ASTM D-4212 (88)
Wt. Per Gallon		ASTM D-1475 (90) Modified
Specific Gravity		ASTM D-1475 (90)
• **Wet Chemical Analysis:**		Depends on material and analysis indicated

MWD TESTING USING ASTM PROCEDURES

TEST VENUE	ASTM STANDARD
IMMERSION IN:	
Finished, Filtered, Raw and Softened Water	**ASTM D-870 (87) Modified**

Purpose: This procedure tests a coating's resistance to water by installing immersion coated panels into troughs containing the various types of water processed and treated at Metropolitan's F.E. Weymouth Plant located in La Verne, California. Softened water used for testing is prepared by adding sodium chloride, reducing total hardness to 2 to 3 ppm calcium carbonate. Chemical properties of finished, filtered, and raw waters can be found on table A, listed under source waters for the F.E. Weymouth plant. This test may be modified to include immersion in chemicals.

Procedure: Three inch by seven inch coated steel panels are immersed into 72 degree +/-4 degrees Fahrenheit water for 2 years, Eighty percent of the test panel is under water while 20 percent of the panel is above water. Flow rates of the troughs range from 2 to 5 gallons per minute. Test panels are evaluated every three months to determine any changes in the coating's physical properties. A coating will be considered unsuitable for immersion service if it develops any signs of rust, blistering, or softening.

Equipment: Equipment necessary to conduct this test includes: 3 inch by 7 inch by 1/8 inch thick steel test panels, fiberglass immersion troughs measuring 7 inch by 7 inch by 15 feet long, an irrigation timer (Irritrol MC-8 Plus), Hunter HP ¾ inch diameter automatic valves, ¾ inch diameter manual PVC or brass globe valves, and a water source. (Trough dimensions and method of construction can be modified to accommodate available space.)

Note Equipment necessary to prepare and apply test coatings includes: an abrasive blast cabinet (Kelco model 100900) and HVLP spray gun (Devilbiss model JGHV 530.)

Duration of Testing: Two years

Pass/Fail Criteria: A pass will exhibit no blisters, loss of adhesion to the substrate, intercoat delamination, rust, or discoloration.

CATHODIC DISBONDING (Water) ASTM G-8 (79)

Purpose: This procedure provides a method for determining the dielectric strength of a coating and its ability to resist disbonding when exposed to electrical overvoltages as a result of cathodic protection.

Procedure: A 4 inch diameter by 2 foot long piece of pipe is externally coated and allowed to cure. A resin cap 6 inches in diameter by 2 inches thick is cast on one end of the pipe to seal the end from water intruding to the internal portion of the pipe and also to provide a base stand for the pipe. The coated pipe is inspected for holidays using a low voltage holiday detector. Coating resistance is measured with an Ohmmeter. Acceptable resistance should exceed 20,000 Ohms. If the sample passes both criteria, a ¼ inch diameter holiday is made through the coating, nine inches up from the bottom of the pipe. The sample is then immersed in a solution of artificial seawater while simultaneously exposing it to an electrical potential of 1.5 +/-0.05 volts generated by a magnesium anode. Purpose for the holiday is to provide a path for the current generated by the anode to the pipe substrate. The test sample is evaluated daily for one week, reducing evaluations to every other day for two weeks, then further reducing to once a week after the third week. The following data is recorded each time the coated pipe is evaluated: Description of the coating's physical appearance, voltage output, and milliamp demand. The test period is 120 days.

Equipment: Equipment necessary to conduct this test includes: a 4 inch diameter by 2 foot long externally coated pipe sample, electrically insulated PVC cells measuring 1 foot by 1 foot by 2 feet deep, a low voltage holiday detector, a Digital Multimeter (Tinker and Rasor M-1), a copper-copper sulfate reference cell, Sodium Chloride, Sodium Carbonate, Sodium Sulfate for preparation of artificial seawater, and 1 inch diameter by 2 feet long magnesium anodes. (Magnesium anodes will normally last a period of 240 days before requiring replacement.)

Duration of Testing: One-hundred twenty days. (Occasionally this duration will be extended based on performance of the coating.)

Pass/Fail Criteria: No blisters, delamination, or milliamp readings above 1.1ma during the 120 day test period.

Note Used saltwater solution may be considered hazardous waste.

CATHODIC DISBONDING (SOIL) ASTM G-19 (88) Modified

Purpose: This procedure provides a method for determining the dielectric strength of a coating and its ability to resist disbonding when exposed to electrical overvoltages as a result of cathodic protection when buried in soil.

Procedure: A 4 inch diameter by 4 foot long piece of pipe is externally coated and allowed to cure. The pipe is inspected for holidays with a low voltage holiday detector. Coating resistance is measured with an Ohmmeter. Resistance should be above 20,000 Ohms. If the sample passes both criteria, a ¼ inch holiday is made in the coated pipe 9 inches up from the bottom of the pipe. Purpose for the holiday is to provide a path for the current generated by the anode. The sample is then buried in a low resistance soil while simultaneously exposing it to an electrical current of 1.5 +/-0.05 volts generated by a magnesium anode. Depth of burial for the sample is 3 feet, allowing one foot of the pipe to extend above ground level. Voltage and milliamp readings are taken daily for one week, reducing readings to every other day for two weeks, then further reducing to once a week after the third week. Results are recorded regarding voltage and milliamp demand for 2 years minimum. *Note* Pipe samples cannot be easily inspected due to the depth of soil cover.

Equipment: Equipment necessary to conduct this test includes: Plastic or wooden boxes with an internal measurement of 3 feet by 3 feet by 3 feet deep, 4 inch diameter by 6 feet long steel pipe, a low voltage holiday detector (Tinker and Rasor M-1), a Digital Multimeter, copper-copper sulfate reference cell, soil with high clay content, and a 10 pound magnesium sack anode capable of producing 1.5 +/-0.05 volts.

Duration of Testing: Two years minimum.

Pass/Fail Criteria: No blisters, delamination, or milliamp readings above 1.1 ma. within the 2-year test period.

ABRASION TEST TABER ABRASER METHOD ASTM D-4060 (90)

Purpose: This procedure evaluates a coating's ability to resist abrasion utilizing a Taber Abraser (model 503 standard). This test determines a coating's resistance to abrasion produced by solid particles.

Procedure: Test coating is applied to one side of a 4 inch square by 1/8 inch thick steel panel and allowed to cure. The panel is then placed on the Taber abraser machine. Abrasion wheels are selected based on coating hardness and the intended end use of the coating. The panel is then abraded for a predetermined number of cycles to determine the Taber Wear Index number for the test coating. Taber Wear Index number is a calculation factoring in the loss of coating in grams, the number of cycles performed, and the specific gravity of the coating. This index allows for comparison of abrasion resistance based on similar coatings and wheel hardness.

Equipment: Equipment necessary to conduct this test includes: A Taber Abraser (model 503 standard), 4 inch square by 3/32 inch thick steel panels, and an analytical balance capable of having an accuracy within 0.001 grams.

Duration of Testing: Typically 1000 cycles. This may vary depending on type of coating tested, abrading wheels used, weight of counter balances, and the intended end use of the coating.

Pass/Fail Criteria: Test specimen should possess a similar wear index to comparable products currently used by Metropolitan.

ACCELERATED WEATHEROMETER ASTM D-2565 (89) Modified

Purpose: This procedure provides a method for determining the effects of ultraviolet and wet/dry cycles on coatings and other materials. This test is used when results are needed within a short period of time.

Procedure: A steel panel 2-7/8 inches wide by 6 inches long by 3/32 inch thick receives proper surface preparation and is then coated. Once cured, the test panel is installed in the weatherometer and subjected to a combination of ultraviolet light and demineralized water. Testing takes about 5 weeks to provide exposure equal to 1 year actual atmospheric conditions for Southern California. Superior performing products exhibit little or no loss of gloss and reflectance, rust, blistering, fading, or chalking.

Equipment: Equipment necessary to conduct this test includes: An accelerated weatherometer such as the Atlas Ci-65 Xenon Arc Weatherometer used by Metropolitan, 2-7/8 inch wide by 6 inch long by 3/32 inch steel panels, and a source for demineralized and finished water. Optional equipment consists of gloss and reflectance meters.

Duration of Testing: A minimum of 5 weeks.

Pass/Fail Criteria: An acceptable coating would not experience blisters or rust. Fading, loss of gloss, or reflectance, may be allowed if it is deemed only slight in appearance.

CAVITATION TESTING: None applicable

Purpose: This procedure provides a method for evaluating a coating's ability to resist high velocity cavitation and erosion. This procedure, developed by members of the Metropolitan Corrosion Engineering branch, is designed to simulate "real world" conditions of high water velocity, turbulent flow, erosion, and corrosion. This test is very important in evaluating coatings intended for use in high velocity-cavitating conditions.

Procedure: Steel test panels measuring 2 inch wide by 7 inch long by ¼ inch thick are coated and allowed to cure. Once cured, two panels are installed in two separate chambers. Cavitation testing exposes coated panels to water streams of high velocities and pressures. These chambers direct streams of water at the upstream portion of the test coupon measuring 175 psi, dropping to 30 psi just below the test panel. The sudden change in pressure creates a turbulence on the coated panel while producing microscopic vapor bubbles on the coated surface. These bubbles collapse and create cavitation. Coated panels are exposed for 24 hours. Metal panels are exposed for 28 days. Cavitation resistance is determined by weight loss of test panel and amount of coated surface or metal removed from the test panel. Following testing, the panel will be compared to similar materials to determine pass or fail criteria. Generally, the less material removed from the panel the better the cavitation resistance.

Equipment: Equipment necessary to conduct this test includes: Steel panels 2 inch wide by 7 inch long by ¼ inch thick, cavitation chambers complete with manifold valves, hardware, and a supply of a large volume of high pressure water. (It should be noted that cavitation testing can also be done on smaller scales utilizing less volumes and pressures of water.)

Duration of Testing: Twenty-four hours for coated panels and 28 days for metal panels.

Pass/Fail Criteria: Pass and failure is subjective and is based on comparisons of similar types of materials.

HIGH HUMIDITY TEST

ASTM B-117 (90) Modified and ASTM D-2247 (87)

Purpose: This test evaluates a coating's ability to resist degradation while in humid environments. In this procedure coated test panels are exposed to 100 percent relative humidity at 100 degrees Fahrenheit. This test evaluates a coating's ability to resist degradation while in humid environments.

Procedure: Steel panels 2 inch by 7 inch by ¼ inch thick are coated and allowed to cure. These panels are installed in a high humidity/prohesion test cabinet which produces humidity by atomizing demineralized water heated to 100 degrees Fahrenheit. Most panels will have a 4 inch long "X" scribed through the coating to the steel substrate. Purpose for this "X" is to observe any undercutting and peeling along the scribed surface. This test is conducted for 120 days, and following testing the panels are examined for rust, blisters, coating delamination, and softening. A successful pass would exhibit no blemishes.

Equipment: Equipment necessary to conduct this test includes: A high humidity cabinet such as the Atotech At-15 Pro used by Metropolitan, 3 inch wide by 7 inch long by ¼ inch thick steel panels, and a source for demineralized water.

Duration of Testing: One-hundred twenty days minimum.

Pass/Fail Criteria: Coated panel shall exhibit no rust, blisters, delamination or softening of the coating.

KTA (CYCLICAL) ENVIROTEST

ASTM D-2246 (87) Modified

Purpose: In this procedure coated panels are exposed to cyclic stresses created by changes in the exposure environment. This test evaluates a material's ability to resist degradation under conditions of humidity, heat, immersion and ultraviolet light.

Procedure: Steel panels 4 inch by 6 inch by 1/8 inch thick are coated and allowed to cure. Panels are then installed in the cyclical test cabinet and exposed to cycles of wet, dry, light, dark, hot, and cold for 1,600 hours. Panels are evaluated for signs of rust, blistering, delamination, fading, and softening of the coating. A passing or successful test would be a coating exhibiting none of the defects listed above.

Equipment: Equipment necessary to conduct this test includes: A cyclical test cabinet such as the KTA Envirotest used by Metropolitan, and a source for demineralized water.

Duration of Testing: 1,600 hours of exposure.

Pass/Fail Criteria: A passing test panel will exhibit no rust, blisters, delamination, fading or cracking.

ATMOSPHERIC WEATHERING: ASTM G-7 (89) Modified

Purpose: This procedure tests a coating's resistance to cracking, peeling, and fading by exposing the coated panels to natural sunlight.

Procedure: Test panels 2 inch wide by 7 inch long by ¼ inch thick steel panels are coated and allowed to cure. Panels are then installed on racks positioned at a 45 degree angle, outdoors facing south. In addition to ultraviolet exposure, the test panels are subjected to moisture in the form of rain and airborne pollutants such as smog. Panels are evaluated for coating deterioration such as: rust, fading, chalking, and discoloration. Minor chalking, fading, and loss of gloss are considered acceptable.

Equipment: Equipment necessary to conduct this test includes: Test racks which can vary in size depending on the number of test panels. Racks are configured to allow panels to face at a 45 degree angle to the sun. Metropolitan's racks measure 4 feet high by 30 inches wide by 80 inches long.

Duration of Testing: Eighteen months minimum;

Pass/Fail Criteria: Test panels which exhibit minor fading and chalking are considered a pass. Damage more severe such as rusting or moderate discoloration would constitute a failure.

SLANT SHEAR TEST: ASTM C-882 (91) Modified

Purpose: This procedure provides a method for determining bond strength of epoxy resin-based or other adhesive materials when applied to cementitious substrates. Materials tested by this method are typically used for repair of concrete.

Procedure: Concrete cubes measuring 2 inches by 5 inches long and cast on a 45 degree slant receive prescribed surface preparation as required. Epoxy is applied to the 45 degree side of each block at a thickness recommended by the manufacturer, joined together, then cured for the length of time recommended by the manufacturer. The finished product produces a cube that will be placed in compression to create shear forces. Strengths achieved are known as shear strengths. Shear strengths can be converted to pounds per square inch (psi). Acceptable test results include samples with shear strengths greater than concrete compression strengths or when concrete fails before the epoxy joint.

Equipment: Equipment necessary to conduct this test includes: A Universal Testing Machine such as the Instron model 4206 used by Metropolitan, molds to cast concrete shear blocks, an abrasive blaster (Kelco model 100900) to prepare concrete samples and application equipment.

Duration of Testing: Approximately 15 minutes per block.

Pass/Fail Criteria: Epoxy with strengths greater than concrete compression strengths. Concrete that fails before the epoxy would constitute a pass.

ADHESION TESTING: ASTM D-4541 (85)

Purpose: This procedure provides a test method for determining the pull-off strength of coatings to various substrates as well as to other coatings.

Procedure: Precoated panels are prepared by lightly abrading the test location with 80 grit sandpaper. The aluminum dolly which will be affixed to the test surface is abraded on its surface and then adhered to the test location. Adhesives such as "Crazy Glue or Epoxy provided by Elcometer" are applied to the dolly and adhered to the coating. Excess adhesive should be removed immediately from around the dolly. Glued dollies are allowed to fully cure as required by adhesive manufacturer. The adhesion tester is then placed over the dolly and secured to the dolly. Tightening the handle on the adhesion tester applies an even pulling pressure on the dolly causing it to pull off the coated surface. A minimum of three tests shall be performed on each sample. Factors influencing adhesion strength include: Generic type of coating, substrate adhered to, age of coating, and surface preparation of the coating.

Equipment: Equipment necessary to conduct this test includes: An adhesion tester such as those manufactured by Elcometer, aluminum dollies sold by Elcometer, 80 grit sandpaper, and adhesive.

Duration of Testing: Testing takes 24 hours due to time required for adhesive to cure. Otherwise pulling of dollies takes 5 minutes per dolly.

Pass/Fail Criteria: Successful adhesion strengths depend on many factors. Visual inspection of the specimen will provide important information regarding failure type and mode, e.g., cohesive failure or adhesive failure. Typically a polyamide epoxy over an abrasive blasted surface should produce an adhesive strength of 700 to 1000 psi per dolly.

SPECTROSCOPIC ANALYSIS OF COATINGS ASTM E-932 (89)

Purpose: This procedure is a method for analyzing organic constituents of a coating by Infrared Spectrophotometry. This test is used to identify coatings by family based on organic constituents present.

Procedure: The Spectrophotometer generates and directs a laser beam of infrared light at the coating held in a specialized crystal. This crystal is designed to filter unwanted radiation while allowing desirable radiation to contact the coating. The result is a spectrum of the test material. This spectrum will indicate which family of organic products the coating belongs to and can quantify the amount of organic constituents.

Equipment: Equipment necessary to conduct this test includes: An Infrared Spectrophotometer such as the Nicolet 510 P used by Metropolitan, a computer to run the Spectrophotometer, and a plotter.

Duration of Testing: To produce a spectra takes between 15 minutes to several hours depending on type of material and if sample is liquid or solid.

Pass/Fail Criteria: This procedure is normally used to identify and classify coatings. Pass/fail criteria is based on determining by identification if a coating is or is not in the family or class that was specified for a particular project.

WET TO DRY HIDING CHANGE (SPREAD CARDS) ASTM D-5007-(89) Modified

Purpose:	This procedure is a method, which visually evaluates a coating for hiding power, cure time, and undissolved solids in a cured coating. To determine hiding properties requires applying a coating to special black/white spread cards to determine its ability to cover a light/dark substrate without "bleeding" through. Then the coating is visually examined for undissolved particulates. Dried coatings should be smooth and without noticeable particulates. When particulates are observed in the dry film this indicates a coating's pigment may have been improperly ground or the coating is "seeding out." Seeding out refers to a condition when pigments fall out of solution and solidify due to the coating being old or unstable. Spread cards may also be used to determine a coating's speed of cure. Cure time is dependent on specified coating's thickness proper mixing, solvent content, and other variables. Once the coating is applied, it is timed to determine if the cure time matches manufacturer's specifications.
Procedure:	A spread card is secured to a draw down table by a vacuum that is drawn through holes in the table. A dollop of paint is placed on the spread card and is pulled across the spread card with a calibrated draw down bar (Logicator multi-notch applicator). These bars are milled and calibrated at thicknesses from one to eight mils. The coating film is allowed to dry and examined for coverage, color, and any irregularities.
Equipment:	Equipment necessary to conduct this test includes: A Logicator multi-notch applicator, Logicator test charts, a vacuum plate, and a visual hiding standard. All items listed are available from the Leneta Company located in Ho-Ho Kus, New Jersey.
Duration of Testing:	Testing takes approximately 15 minutes. Coating is allowed to dry overnight and examined for qualities listed above.
Pass/Fail Criteria:	A passing sample shows full hide at manufacturer's specified thickness and shows no impurities in the coating film.

PHYSICAL ANALYSES OF COATINGS INCLUDING:

SOLIDS BY WEIGHT: ASTM D-2369 (90) Modified

Purpose:	This procedure describes a method for determining the percent by weight of solids of a coating. This method allows the tester to compare a manufacturer's published solids content with results derived in the lab.

Procedure: A clean, unused, evaporative dish and stirring rod are weighed and weights recorded on a lab data sheet. The weight of the sample, dish, and stirring rod are also recorded on a lab data sheet. The dish with the coating and rod are placed in an oven and heated to 110 degrees Centigrade and stirred periodically until all solvent has evaporated. Once the coating and dish have cooled, a final weight is taken. Calculations are performed to determine percent solvent driven off leaving percent solids by weight of the coating.

Equipment: Equipment necessary to conduct this test includes: A 200 ml teflon evaporating dish, an oven capable of heating samples to 110 degrees Centrigrade, 22 gauge stainless steel wire, and an analytical balance accurate to 0.001 grams.

Duration of Testing: Twenty-four hours.

Pass/Fail Criteria: Coating should meet manufacturer's specs +/-2 percentage points.

SOLIDS BY VOLUME: ASTM D-2697 (86) and ASTM D-2832 (91) Modified

Purpose: This procedure describes a method for determining volume solids of a coating. This test allows the tester the ability to compare a manufacturer's published solids content with results derived in the lab.

Procedure: Clean stainless steel discs are weighed in both air and water to determine their volume. The discs are dip coated with the test paint and allowed to dry. Coated discs again are weighed both in air and water to determine volume of coated discs. Calculations are performed subtracting the volume of the uncoated discs from the coated discs leaving the volume of the coating. This test confirms that manufacturer's data regarding solids by volume is correct.

Equipment: Equipment necessary to conduct this test includes: 1-1/2 inch diameter by 1/16 inch thick stainless steel discs, an analytical balance accurate to 0.001 grams, 1000 ml glass beaker, a thermometer, and a source for demineralized water.

Duration of Testing: Twenty-four hours to perform the entire process.

Pass/Fail Criteria: Test is not pass or fail but used as a comparative against manufacturer's data.

VISCOSITY — ASTM D-4212 (88) Modified

Purpose: This procedure describes a method to determine fluidity or viscosity of a coating or related liquid material. This test can be used to determine if a coating has been properly prepared.

Procedure: A calibrated viscometer, such as the Zahn viscosity cup used by Metropolitan, is filled to the top with the test coating. The viscometer is lifted above the coating container allowing the coating to drain out the hole in the bottom of the viscometer. A stopwatch is used to time the draining of the coating. Once there is a hesitation in draining of the coating, the test is stopped and time is recorded. Elapsed time and Zahn cup size are important in determining viscosity of the test coating. Results are compared to viscosity found in manufacturer's data sheets.

Equipment: Equipment necessary to conduct this test includes: Zahn cups number 1 through 5 and a stopwatch.

Duration of Testing: Testing requires approximately 15 minutes to perform.

Pass/Fail Criteria: Viscosity should match manufacturer's numbers listed in product data sheets.

WEIGHT PER GALLON — ASTM D-1475 (90) Modified

Purpose: This procedure describes a method to determine a coating's weight per gallon. Results of this test also provide specific gravity of the coating

Procedure: This test requires use of a calibrated pyncometer having a volume of 83.33 cc. The empty pyncometer is weighed and the numbers recorded. The coating is added to the Pyncometer filling it to the top. The lid is installed and filled pyncometer is reweighed. The weight of the empty pyncometer is subtracted from the full one and the product divided by 83.33. The result provides weight per gallon and specific gravity of the coating.

Equipment necessary to conduct this test includes: One 83.33 cc

Equipment:	calibrated pyncometer and a balance which can weigh items to 400 grams or above. Accuracy should be 0.001 grams minimum.
Duration of Testing:	Testing takes approximately 30 minutes.
Pass/Fail Criteria:	Test results should coincide with manufacturer's published data found on product data sheet.

SPECIFIC GRAVITY: ASTM D-1475 (90)

Same as procedure for determining weight per gallon.

WET CHEMICAL ANALYSIS:

Tests can vary depending on material analyzed and results desired.

Attachment 3

Reduction of Present MWD Approved Coatings Based on VOC Limits Proposed in California Air Resources Board (ARB) Suggested Control Measure(SCM) for Architectural Coatings - Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds

17-7

Coating Type A Architectural Coatings: steel tank exteriors, steel structures, bridges, platforms, pumps, transformer cabinets, slide gates.	**CARB Current VOC Limits g/l**	**CARB Proposed VOC Limit Effective 7/1/2002 [a,b]**	**CARB Proposed VOC Limit Effective 7/1/2006 [a,b]**	**% Reduction in Coatings Available (on MWD 1999 List) @ CARB 7/1/2002 VOC Limit: 250 g/l**	**% Reduction in Coatings Available (on MWD 1999 List) @ CARB 7/1/2006 VOC Limit: 100 g/l**
1. Polyurethane Enamels (26)	340	250	100	89%	100%
2. Inhibitive Epoxy Primers (13)	340	250	100	58%	100%
3. Waterborne Acrylics (9)	340	250	100	44%	80%
4. Silicon & Synthetic Alkyds (17)	340	250	100	100%	100%
5. Epoxy Mastics (10)	340	250	100	10%	100%
6. Zinc Rich Epoxy & Urethane Primers (6)	340	250	100	88%	100%
7. Iron Oxide & Special Primers (12)	340	250	100	83%	100%

17-8

Coating Type B Immersion Coatings: interior steel tanks, water treatment equipment, pumps, weirs, pipeline interiors	**CARB Current Limits g/l**	**CARB Proposed VOC Limit 7/1/2002 Effective Date of Adoption [a,b]**	**CARB Proposed VOC Limit Effective 2006 [a,b]**	**% Reduction in Coatings Available (on MWD 1999 List) @ CARB 7/1/2002 VOC Limit: 250 g/l**	**% Reduction in Coatings Available (on MWD 1999 List) @ CARB 7/1/2006 VOC Limit: 100 g/l**
1. Coal Tar Epoxies (4)	340	250	100	50%	100%
2. High (80-90%) Solids Epoxies (7)	340	250	100	0%	85%
3. Low (50-80%) Solids Epoxies (6)	340	250	100	88%	100%

[a] These limits are subject to revision based on the outcome of scheduled SCAQMD technology assessments. Compliance with these limits is contingent upon availability of VOC compliant coating technology and products performing in a satisfactory manner. VOC limits shall be amended based on the results of the technology assessment.

[b] Based on California Air Resources Board Suggested Control Measure for Architectural Coatings, second draft - 6/10/99.

Note: Numbers in parentheses reflect total number of coatings or coating systems i.e. one top coat may be included with one or more primers to comprise separate multiple coating systems.

6/24/99

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
ENGINEERING SERVICE CENTER
OFFICE OF MATERIALS AND FOUNDATIONS - MS #5
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June 22, 1999

Mr. Jim Nyarady, Manager
Strategy Evaluation Section
Air Resources Board
2020 L Street
Sacramento, CA 95812

Dear Mr. Nyarady:

This correspondence contains a summary of Caltrans comments on the draft proposed changes to the Air Resources Board's (ARB) Suggested Control Measure for Architectural Coatings (SCM), and suggestions for modifications to the SCM. Caltrans believes these modifications are necessary so that we can continue to maintain structural steel bridges throughout California and prevent infrastructure deterioration.

18-1 Caltrans is responsible for the construction and maintenance of all state and federally designated highways throughout California, including over 1000 steel bridges spanning more than 20 feet. Caltrans shares the concerns of the ARB regarding the impact volatile organic compounds (VOC) contained in industrial maintenance coatings have on air quality. Since 1978, we have been striving to utilize protective coatings with VOC contents less than 250 g/L. This effort has entailed extensive evaluations of available low-VOC coatings from industrial coating suppliers and in-house formula development utilizing recommendations from raw material suppliers when available coatings have not met our requirements. Our efforts have been quite successful. Over 90% of the industrial maintenance coatings currently used by Caltrans meet the 7/1/2002 proposed limit. The average VOC for all of our industrial maintenance coating use for 1998 was less than 200 g/L. Unfortunately, despite our best efforts, we still need to use coatings with higher VOC levels for isolated areas on most structures and for structures located adjacent to the coast.

We currently have no replacement products for these higher VOC coatings. We estimate that it will take us a minimum of five to six years to evaluate and fully implement compliant coatings for these uses assuming such coatings are available today.

18-2

- Consequently, we request that the implementation date for the 250 g/L requirement be extended to January 1, 2005. This date should be contingent upon a thorough review to ensure acceptable performance of these coatings as applied under field conditions prior to the effective date. We further request a delay in implementing a reduction to 100 g/L until at least 2008 to allow sufficient time to evaluate compliant coatings without interfering with evaluations of the 250 g/L coatings.

18-3 If the implementation dates cannot be delayed, Caltrans has an alternative suggestion. The South Coast Air Quality Management District (SCAQMD) recently adopted modifications to Rule 1113 that contain an averaging provision that would allow manufacturers of protective coatings to offset sales of higher VOC coatings with sales of lower VOC coatings under specified procedures provided the average VOC for the affected coatings complies with specified requirements. This provision is of no benefit to Caltrans because as a public agency, we are required to have a minimum of three comparable materials for a contract. Additionally, specifications are normally developed from two to three years prior to bidding a contract. We would have no assurance that a coating that met the VOC limit based on an averaging provision when a specification was written would still be exempt when a contract was awarded.

18-4

- We could comply with the 250 g/L limit today if this provision were allowed for end users. The average VOC for all industrial maintenance coatings used by Caltrans in 1998 (approximately 90,000 gallons) was close to 170g/L. We would be willing to maintain and provide records of coating use to the ARB or local air pollution control district to show that the average VOC for our total coating use meets the specified limits.

Thank you for considering our comments and recommendations. If you have any questions concerning this letter, please contact me at (916) 227-7289 or by e-mail at andy_rogerson@dot.ca.gov.

Sincerely,

ANDY ROGERSON, Chief
Chemical Testing Section

c: Paul Benson

WASTEWATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

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CHARLES W. CARRY
Chief Engineer and General Manager

July 22, 1999

File No: 31-380.10B

Mr. Jim Nyarady
Air Resources Board/Strategy Evaluation Section
2020 L Street
Sacramento, CA 95812

Dear Mr. Nyarady:

Suggested Control Measure for Architectural Coatings

The County Sanitation Districts of Los Angeles County (LACSD) appreciate the opportunity to comment on the Suggested Control Measure for Architectural Coatings (SCM). LACSD staff participated in the public workshops and working group meetings for the recent amendments to SCAQMD Rule 1113. LACSD offers the following comments on the June 10, 1999 draft SCM.

19-1 As part of our effort to comply with Rule 1113, LACSD will evaluate the performance of low or zero VOC coatings used in the wastewater industry. LACSD will work with the SCAQMD in testing reformulated industrial maintenance coatings suitable for wastewater environments. Coatings that perform well at other industrial facilities, including water treatment environments, will not necessarily perform well at wastewater facilities due to the unique, severely corrosive conditions that can exist. Since we operate our facilities around the clock, 365 days a year, and our limited ability to remove equipment, we must use proven coatings.

19-2 If the low or zero VOC coatings tested perform satisfactorily in the laboratory and field tests, LACSD would incorporate these coatings into our coating specifications. However, if problems are discovered during testing, LACSD has received SCAQMD's assurance that Rule 1113 will be revised appropriately. The revisions would either raise the VOC content limits for the industrial maintenance coatings used in wastewater or create specific exclusions. The testing program should provide SCAQMD with information suitable for defending any revisions against backsliding inferences.

19-3 LACSD, on behalf of the wastewater industry, seeks ARB's assurance that the SCM will also be revised appropriately based on the outcome of the SCAQMD technology assessments.

19-4 This provision is included as footnote "c" to Table 1 in the June 10, 1999 draft and should be included in the final SCM.. Furthermore, ARB should encourage all districts to revise their rule limits based on the results of the technology assessments.

LASCD looks forward to evaluating low or zero VOC coatings as part of SCAQMD technology assessments and reflecting the results in the SCM. If you have any questions, please contact Ms. Preeti Ghuman of this office at (562) 699-7411, extension 2138.

Yours very truly,

Charles W. Carry

Gregory M. Adams

Gregory M. Adams
Assistant Departmental Engineer
Office Engineering Department

GMA:PKG:tk

cc: Jack Broadbent
Naveen Berry
Brian Whitaker
Blake Anderson

~~James E. Nyarady~~
S.K

July 21, 1999

Mr. Dean C. Simeroth, Chief
Criteria Pollutants Branch
Stationary Source Division
Air Resources Board
2020 "L" Street
P. O. Box 2815
Sacramento, California 95812

Multi-Agency Comments on the Suggested Control Measure for Architectural Coatings

Dear Mr. Simeroth:

This correspondence represents the collective comments to the Air Resources Board (ARB) on the draft 6/10/99 proposed changes to the Suggested Control Measure for Architectural Coatings (SCM) of four major California public agencies – the Metropolitan Water District of Southern California (Metropolitan), the California Department of Water Resources (DWR), the California Department of Transportation (Caltrans), and the Los Angeles Department of Water and Power (LADWP). Representatives of each agency have also met with ARB representatives (Don Ames, Jim Nyarady, Mike Jaczola) on June 23, 1999 to discuss the draft document. Metropolitan, DWR, and LADWP provide water for municipal and industrial use (approximately 1.8, 3.0, and 0.6 million acre-feet of water per year, respectively) and operate extensive systems of water conveyances, reservoirs, water treatment plants and power plants. In addition to water supply, LADWP is responsible for providing electric power to the residents and businesses of Los Angeles. Caltrans is responsible for construction of all State and Federally designated highways throughout California. MWD and Caltrans currently have laboratories which conduct technical assessments of coatings utilized on their public structures, the results of which are often relied upon by other related public entities. The comments herein reflect our common views and concerns as affected agencies located in the State of California.

20-1 MWD, DWR, Caltrans and LADWP are supportive of the efforts to reduce volatile organic compound (VOC) emissions from the application of architectural coatings. We recognize and appreciate ARB's efforts to harmonize the draft proposed SCM's provisions with existing related federal and regional regulations. However, as end-users of architectural/industrial maintenance (AIM) coatings on critical components of our public service systems, MWD, DWR, Caltrans and LADWP have concerns with respect to protecting this critical equipment from corrosion and having sufficient time to identify and test the lower VOC AIM coatings to determine their adequacy to replace existing high performing coatings. As an example, the SCAQMD Rule 1113, Architectural Coatings, addresses these concerns by identifying a contingency provision for "essential public service coatings" (EPSC). We are requesting that an EPSC provision also be provided in the SCM. The specific concerns and recommendations of MWD, DWR, Caltrans and LADWP are provided below.

Available Replacement Coatings

20-2 **Issue**: The draft proposed SCM includes the following: revised definition of "Industrial Maintenance Coatings"; and reduction of VOC limits in specific AIM categories, including Industrial Maintenance coatings (from 340 g/l to 250 g/l, effective July 1, 2002, and from 250 g/l to 100 g/l effective January 1, 2006). While supportive of the goal to reduce VOC emissions, as public agencies we have concerns regarding the timely availability of compliant coatings which meet field needs. A lack of coatings which have been demonstrated to perform comparably to existing products could conceivably result in the use of coatings which may not adequately protect and possibly result in accelerated damage to our public infrastructures (e.g., pipelines, water conveyance equipment, tanks, bridges, or electrical equipment). This would seriously impact our essential services to the public of reliable water and electric power delivery and highway integrity, as well as potentially affecting our mandate to minimize the occurrence of service interruptions.

20-3 Time is required to identify, and perform laboratory and field tests of new compliant coatings. Five to six years is required for this process. For example, the coating evaluation process of a first generation coating at Caltrans entails a laboratory screening and characterization, including a health and safety review (4 months), cyclic corrosion testing in the laboratory (8 months), field application tests (2 years), and specification development and implementation (1-2 years). Additionally, it has been MWD's experience that 80 % of the coatings tested in its Corrosion Control Laboratory do not meet MWD's performance standards and are rejected for poor performance reasons. Additionally, 75 % of the coatings tested by MWD do not meet the physical and performance characteristics stated in the manufacturer's technical product data sheets. To exemplify this, Attachment 1, the Table of Metropolitan Water District Coating Performance Testing Results, identifies five coatings that MWD has tested and rejected for performance reasons.

20-4 **Recommendation**: To provide adequate time for the identification and testing of lower VOC compliant coatings, we recommend that similar to SCAQMD Rule 1113, a category be established for EPSC with a modified interim VOC limit, but subject to the same final VOC limit and effective date as the Industrial Maintenance Coating category . These coatings would be defined as, "protective (functional) coatings applied to components of power, municipal wastewater, water, bridges and other roadways". The EPSC VOC limits and phased effective dates, would be: 340 g/l, date of adoption; 100 g/l, 7/1/2006 (adoption subject to the results of the scheduled SCAQMD technology assessments). Attachment 2 provides information regarding affected coating applications which are critical to our services.

Again, by establishing this modified interim limit, adequate time would be provided to test the new coatings. Once the test results identify satisfactory lower VOC coatings, these new coatings will be incorporated into our agencies' operations as replacements for the comparable higher VOC coatings. We do not envision exercising the EPSC option unless necessary (e.g., suitable lower VOC coatings cannot be identified). Additionally, it should be noted that as Essential Public Service Agencies, MWD, DWR, Caltrans, and LADWP are committed to participating in the technical assessments with SCAQMD staff, as directed by the SCAQMD Board Resolution No. 99. We are prepared to meet with SCAQMD staff and other interested public agencies in the next few weeks to begin planning of the technical assessments.

2) Available Repair Coatings

20-5 **Issue:** Currently, Metropolitan, DWR, Caltrans and LADWP have structures that are coated with solvent borne coatings. Over time, these structures will require patch repair and maintenance using a compatible coating system. In order to maintain manufacturer warranty of the coating, the same solvent borne coating that was originally applied, or a repair coating approved by the manufacturer would need to be utilized. Once the proposed SCM becomes effective, these coatings may not meet the required VOC limits. The alternative to utilizing the original coating would be complete removal and recoating (primer, intermediate and topcoat) of the entire structure, which will result in release of a higher VOC volume overall.

20-6 **Recommendation:** The proposed EPSC category and modified interim VOC limit will help ameliorate this concern regarding touch-up and repairs of the existing higher VOC coatings. In addition, as discussed with SCAQMD staff, the cooperative public services technical assessment will include evaluation of the new coatings' compatibility with existing coatings.

Thank you again for the opportunity to comment on the draft proposed SCM and to meet with ARB representatives to discuss our collective agencies' concerns. If you have any questions regarding these comments, please contact any of the representatives identified below.

Very truly yours,

John E. Clark
Manager, Regulatory Affairs Branch
Metropolitan Water District of Southern California
(213) 217-5504

Dan Peterson

Dan Peterson, Chief
Environmental Assessment Branch
Division of Operations and Maintenance
Department of Water Resources
(916) 653-9978

Andy Rogerson
Chief, Chemical Testing Branch
Office of Technology and Testing Services
California Department of Transportation
(916) 227-7289

Timothy J. [illegible] for

Jodean M. Giese
Manager, Corporate Environmental Services
Los Angeles Department of Water and Power
(213) 367-0409

CYK/lov-R-99-160

cc: Donald J. Ames, P.E.
Assistant Chief

✓ James E. Nyarady, P.E.
Manager
Strategy Evaluation Section

Michael P. Jaczola
Staff Engineer

Attachment 1

Table of Metropolitan Water District Coating Performance Testing Results
(Page 1 of 2)

Coating Type	Manufacturer's Description of Performance and Characteristics	VOC (g/l)	Substrate & Prep	Primer	Test Protocol	Test Duration	Evaluation Results	Remarks Regarding Coating Performance
# 101 Two Component Elastomeric Polyurethane Rubber Coating System	Outstanding abrasion resistance, tensile strength and hydrolytic stability	2.4 g/l	Concrete SSPC-7	Polyamide epoxy sealer	Immersion -Untreated Water ASTM D-870 (Modified)	23 months	Failure Mode: Severe color fade; surface cracking; osmotic blistering	Unacceptable: adhesion, color retention; & resistance to permeability
					Immersion -Demin. Water ASTM D-870 (Modified)	23 months	Failure Mode: Severe color fade; surface cracking; osmotic blistering	Unacceptable: adhesion, color retention; & resistance to permeability
					Immersion -Filtered Water ASTM D-870 (Modified)	23 months	Failure Mode: Severe color fade; surface cracking; osmotic blistering	Unacceptable: adhesion, color retention; & resistance to permeability
					Atmospheric ASTM G-7	18 months	Failure Mode: Severe discoloration	Unacceptable: color retention & resistance to weathering
			Steel Panel SSPC-5	Polyurethane primer	Immersion -Untreated Water ASTM D-870 (Modified)	27 months	Failure Mode: Moderate color fade; surface cracking; osmotic blistering, disbonding	Unacceptable: adhesion, poor color retention; & resistance to permeability
					Immersion -Filtered Water ASTM D-870 (Modified)	27 months	Failure Mode: Moderate color fade; surface cracking; osmotic blistering, disbonding	Unacceptable: adhesion, poor color retention; & resistance to permeability
					Immersion -Finished Water ASTM D-870 (Modified)	22 months	Failure Mode: Moderate color fade; surface cracking; osmotic blistering, surface deterioration & disbonding	Unacceptable: adhesion, poor color retention; & resistance to permeability
					Atmospheric ASTM G-7 (Modified)	21 months	Failure Mode: Moderate discoloration; surface etching; surface cracking/checking	Unacceptable: color retention & resistance to weathering
					High Humidity ASTM D-2247 (Modified)	4 months	Failure Mode: Heavy rust formation at X, rust formation at edge radii	Unacceptable: resistance to moisture permeability
					Cathodic Disbonding ASTM G-8 (Modified)	4 months	Polarization established - coating in good condition	Coating passed 120 day exposure CDT test
#102 Two component water based epoxy coating	High performance exterior industrial maintenance enamel. Chemical, abrasion, & impact resistance	176	Steel Panel SSPC-5 (abrasive blasted)	Zinc rich water based epoxy	Atmospheric ASTM G-7 (Modified)	17 months	Failure Mode: Moderate discoloration, loss of 50% gloss	Unacceptable: gloss and color retention & resistance to weathering
					Weatherometer ASTM D-2565 (Modified)	1600 Hours	Failure Mode: surface etching, moderate darkening, small osmotic blisters, 50 loss of gloss	Unacceptable: gloss and color retention, resistance to weathering permeability
				Catalyzed epoxy	Atmospheric ASTM G-7 (Modified)	17 months	Failure Mode: Moderate discoloration, loss of 40% gloss	Unacceptable: gloss and color retention & resistance to weathering
					High Humidity ASTM D-2247 (Modified)	4 months	Failure Mode: rust formation at X, rust formation at edge radii, small osmotic blisters	Unacceptable: adhesion and resistance to moisture permeability & color retention
					Weatherometer ASTM D-2565 (Modified)	1600 Hours	Failure Mode: surface etching, mod. darkening, small osmotic blisters, 63% loss of gloss	Unacceptable: gloss and color retention, resistance to weathering
				DTM acrylic gloss primer	Atmospheric ASTM G-7 (Modified)	17 months	Failure Mode: Moderate discoloration, loss of 30% gloss	Unacceptable: gloss and color retention & resistance to weathering

Attachment 1

Metropolitan Water District Coating Performance Testing Results
(Page 2 of 2)

Coating Type	Manufacturer's Description of Performance and Characteristics	VOC (g/l)	Substrate & Prep	Primer	Test Protocol	Duration	Evaluation Results	Remarks Regarding Coating Performance
# 103 Water reducible, 100% acrylic gloss coating (DTM).	Corrosion resistant coating, excellent moisture resistance, excellent exterior durability	208 g/l	Steel Panel SSPC-5	DTM	Atmospheric ASTM G-7	17 months	Failure Mode: moderate discoloration, acceptable gloss retention, tiny rust spots.	Unacceptable: color retention & resistance to weathering.
					Weatherometer ASTM D-2565 (Modified)	1600 Hours	Failure Mode: slight darkening, 5% loss of gloss	Acceptable: gloss and color retention, & acceptable resistance to weathering.
					High Humidity ASTM D-2247 (Modified)	4 months	Failure Mode: heavy rust formation at X, moderate rust formation all surfaces, osmotic blistering.	Unacceptable: adhesion & resistance to moisture permeability
			Steel Panel SSPC-5	Oil primer	Weatherometer ASTM D-2565 (Modified)	1600 Hours	Failure Mode: moderate darkening blisters, 5% loss of gloss	Acceptable gloss and color retention
					Atmospheric ASTM G-7 (Modified)	19 months	Failure Mode: slight discoloration; 16% loss of gloss.	Acceptable color retention & acceptable resistance to weathering
					Cathodic Disbonding ASTM G-8 (Modified)	4 months	Polarization established - coating in good condition	Coating passed 120 day exposure CDT test
#104 100% solids aromatic elastomeric urethane coating	Coating is designed for immersion in potable water, salt water, and aqueous chemical solutions	0	Concrete SSPC-7 And Steel Panel SSSPC -5	Epoxy Primer	Immersion -Untreated Water ASTM D-870 (Modified)	25 months	Failure Mode: severe darkening;	Unacceptable: color retention.
					Immersion -Filtered Water ASTM D-870 (Modified)	25 months	Failure Mode: severe darkening	Unacceptable: color retention.
					Immersion -Finished Water ASTM D-870 (Modified)	25 months	Failure Mode: severe darkening; surface deterioration; osmotic blistering	Unacceptable: adhesion, color retention; resistance to moisture permeability & chemical exposure.
					High Humidity ASTM D-2247 (Modified)	4 months	Coating in good condition	Acceptable short term resistance to moisture permeability.
			Steel Panel SSPC-5		Cathodic Disbonding ASTM G-8 (Modified)	4 months	Polarization established, however coating developed osmotic blisters and delamination from substrate.	Unacceptable: adhesion, resistance to moisture permeability, & failed CDT test (ASTM G-8)
					Cavitation Test Chamber - stability under conditions of high velocity water flow.	24 hours	Failure Mode; Coating delaminated from substrate.	Coating exhibited unacceptable stability under conditions of high water flow.
# 105 Acrylic primer coating	Premium anti-corrosion industrial maintenance primer for interior and exterior metal surfaces,.	250	Steel Panel SSPC-5	DTM	Atmospheric ASTM G-7	20 months	Failure Mode: moderate discoloration, extensive rust formation.	Unacceptable: color retention, & resistance to weathering.
					High Humidity ASTM D-2247 (Modified)	4 months	Coating formed osmotic blisters, extensive rust spots, moderate darkening.	Unacceptable: color retention, resistance to weathering, & unacceptable resistance to moisture permeability

Attachment 2

MWD, DWR, Caltrans, LADWP Critical Application Usage Information

	Critical Application	VOC (avg) g/l	Estimated Quantity Used (gal/Year)
20-7	1. Areas on structural steel bridges where severe corrosion is occurring at back-to-back plates or connections.	250-300 (Caltrans)	3000 (Caltrans)*
20-8	2. Structural steel bridges that are within one to fifteen miles from the California coastline, estuaries or bays (structures in environments with coastal fog influence more than six months per year).	300-340 (Caltrans)	7500 (Caltrans)*
20-9	3. Exterior of structures that contain, store and convey potable water or source waters as required and defined by the United States Environmental Protection Agency (U.S. EPA) and California Department of Health Services (DHS) Standards, such as pumps, pump housings, electrical control and generation equipment, tanks, containment facilities, bridge structures, pipelines, control gates, or pressure control structures.	290-340 (MWD) 356 (DWR)	4000 (MWD)* 580 (DWR)*
20-10	4. Structures that come into direct contact with static, low flow, and high velocity (cavitation) potable water or source waters as required and defined by U.S. EPA and DHS Standards, such as tank interiors, pipelines, pumps, power generation equipment, canals, channels, or water treatment structures.	200-390 (MWD) 292 (DWR) 391-410 (LADWP)*	3766 (MWD)* 1275 (DWR)* 1,200 (LADWP)**
20-11	5. Structures that come into direct contact with chemicals designed to treat potable water or source waters as required and defined by U.S. EPA and DHS Standards, such as tank interiors, pipelines, pumps, or chemical injection structures.	200-280 (MWD) 285 (DWR)	2880 (MWD)* 125 (DWR)*
20-12	6. Electrical power conveyance system of pole top/vault /generating station transformers, voltage regulators, circuit breakers, bus, and other related electrical equipment.	420 (LADWP)* 330 (DWR)	1,380-13,000 (LADWP)** 200 (DWR)*
20-13	7. Generating stations' equipment (excluding electrical) including motors, pumps, piping, structural steel, tanks, and other related equipment.	220-420 (LADWP)*	2,020 (LADWP)**

* Reflects usage within the State of California

** Reflects usage within the South Coast Air Quality Management District Basin

STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

July 13, 1999

JN

Dean C. Simeroth, Chief
Criteria Pollutants Branch
Stationary Source Board
Air Resources Board
2020 L Street
Post Office Box 2815
Sacramento, California 95812

Dear Mr. Simeroth:

Suggested Control Measures for Architectural Coatings

The California Department of Water Resources operates and maintains the State Water Project which consists of 662 miles of water conveyance systems, 21 reservoirs, 9 powerplants, and 17 large pumping plants located throughout California. These facilities deliver about 3.0 million acre-feet of water a year for municipal, industrial and agricultural use (1 acre-foot = 325,900 gallons) and could deliver up to 4.2 million acre-feet per year.

DWR recognizes and supports the California Air Resources Boards effort to develop a "Suggested Control Measures" provision to comply with the existing federal and regional regulations for reducing volatile organic compound emissions from architectural/industrial maintenance coatings. However, as an end-user of AIM Coatings on critical components of DWR's delivery systems, there is a major concern with the availability of satisfactory compliant AIM coatings. Loss of use of current coatings would result in accelerated damage to pipelines and machinery used to convey water or generate power and jeopardizing reliable water and power delivery throughout California.

21-1 Therefore, DWR suggests that the proposed SCM follow the South Coast Air Quality Management District's amendment to Rule 1113, Architectural Coatings and provide a provision for "essential public services coatings." This provision would allow time to identify, perform laboratory and field tests of new compliant coatings.

Thank you for your consideration and if you have any questions, please call John Frantz, Chief of Corrosion Engineering, at (916) 653-1328 or me at (916) 653-9978.

Sincerely,

Daniel F Peterson

Daniel F. Peterson, Chief
Environmental Assessment Branch
Division of Operations and Maintenance

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June 25,1999

Mr. Jim Nyarady
Manager, Strategy Evaluation Section
Stationary Source Division
Air Resources Board
2020 L Street, P. O. Box 2815
Sacramento, CA 95812

RE: SCAG Clearinghouse #I9900309 Notice of Preparation of a Draft Program EIR for Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

22-1 We have reviewed the above referenced document and determined that it is not regionally significant per Areawide Clearinghouse criteria. Therefore, the project does not warrant clearinghouse comments at this time. Should there be a change in the scope of the project, we would appreciate the opportunity to review and comment at that time.

A description of the project will be published in the **July 1, 1999** Intergovernmental Review Report for public review and comment.

The project title and SCAG Clearinghouse number should be used in all correspondence with SCAG concerning this project. Correspondence should be sent to the attention of the Clearinghouse Coordinator. If you have any questions, please contact me at (213) 236-1917.

Sincerely,

J. DAVID STEIN
Manager, Performance Assessment
and Implementation

JDS:lj

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Riverside County Transportation Commission: Robin Lowe, Hemet

Ventura County Transportation Commission: Bill Davis, Simi Valley

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RESPONSES TO COMMENTS ON THE NOP/IS

Comment Letter #1:	**Kessler & Associates, Inc.**
Comment Letter #2:	**Sherwin-Williams**
Comment Letter #3:	**National Paint & Coatings Association**
Comment Letter #4:	**Painting and Decorating Contractors of America**
Comment Letter #5:	**Society for Protective Coatings**
Comment Letter #6a:	**Law Offices of Smiland & Khachigian**
Comment Letter #6b:	**Law Offices of Smiland & Khachigian**
Comment Letter #7:	**Textured Coatings of America**
Comment Letter #8:	**Ameron International**
Comment Letter #9:	**Euclid Chemical Company**
Comment Letter #10:	**The Valspar Corporation**
Comment Letter #11:	**Sierra Performance Coatings**
Comment Letter #12:	**Flame Control Coatings, Inc.**
Comment Letter #13a:	**Wm. Zinsser & Co., Inc.**
Comment Letter #13b:	**Wm. Zinsser & Co., Inc.**
Comment Letter #13c:	**Wm. Zinsser & Co., Inc.**
Comment Letter #14:	**Zehrung Brands**
Comment Letter #15:	**Akzo Nobel**
Comment Letter #16:	**TruServ**
Comment Letter #17:	**Metropolitan Water District of Southern California**
Comment Letter #18:	**State of California, Department of Transportation**
Comment Letter #19:	**County Sanitation Districts of Los Angeles County**
Comment Letter #20:	**Multi-Agency**
Comment Letter #21:	**Department of Water Resources**
Comment Letter #22:	**Southern California Association of Governments**

ARB received a total of 24 comment letters from 22 different commenters on the NOP/IS for the architectural coatings SCM during the 30-day comment period. Additionally, ARB received one comment letter on the NOP/IS outside the 30-day comment period. Furthermore, ARB received some CEQA-related comments during the June 3, July 1, and September 8, 1999, public workshops.

Many of the comments submitted by the various commenters were not specifically CEQA-related; rather the comments were directed to the scope and structure of the SCM. However, the comment letters and responses to the comments contained in the 24 total comment letters as well as responses to CEQA-related public workshop comments are contained herein.

COMMENT LETTER #1
Kessler & Associates, Inc.
July 12, 1999

1-1. Comment: Reducing VOCs from paints under certain circumstances could actually contribute to ozone nonattainment because of the concept of negative reactivity.

Response: ARB staff disagrees with the commenter's implication that ARB's mass VOC emission control strategy may be counterproductive to ozone reduction. As discussed in detail in the More Reactivity section of Chapter IV in the Draft Program EIR, the ARB staff disagrees with the conclusion that VOC control contributes to ozone nonattainment. Industry's statement that VOC control causes more ozone has not been substantiated under real world atmospheric conditions. Moreover, the atmospheric conditions (characterized by very high VOC-to-NO_x ratios) that must exist in order for VOC control to exhibit an enhancing effect on ozone formation are not likely to occur in urban centers.

1-2. Comment: The SCM should be postponed until ozone chamber studies are conducted. Congress mandated that this chamber be utilized to determine if and when the reduction of VOCs in paint is warranted.

Response: The commenter is referred to the discussion of this issue in the More Reactivity section in Chapter IV of the Draft Program EIR. Also, see Chapter V, Section B of the Draft Program EIR. The objectives of the next-generation chamber are to evaluate gas-phase and gas-to-particle atmospheric reaction mechanisms for determining secondary aerosol yields, and to measure VOC reaction products and radical and NO_X indicator species under more realistic environmental conditions (specifically, lower NO_X environments) (Congressional Record, 1998.) The new chamber may also improve the reactivity assessments of larger VOC species (C_{10}-C_{12}) that, using current methodologies, tend to stick to chamber walls before they can participate in gas-phase reactions. Dr. William Carter, the lead researcher on the project, has stated that conclusive and complete experimental results from the next-generation chamber will not be available for several years.

Given the timeframes for the additional reductions from architectural coatings, development of the SCM cannot be delayed until improved reactivity data are available (Federal Register, 1997). As explained in the More Reactivity section of Chapter IV, the evidence demonstrates that mass-based controls are effective in reducing ozone, so there is no reason to wait for additional reactivity data to be generated.

1-3. Comment: A statewide SCM approach may be counter-productive for several reasons: (1) differences in reactivity among different areas; (2) differences in air quality problems among areas; (3) differences in uses/needs/exposure for architectural coatings; (4) different meteorological conditions; and (5) the necessity to have "stringent and extreme cost-ineffective rules."

Response: The ARB staff disagrees with the commenter's assertion that the SCM could be counter-productive on a statewide basis.

Regarding reactivity, the commenter is referred to the More Reactivity section in Chapter IV of the Draft Program EIR.

The commenter's four remaining assertions can be collapsed into one general comment that the Program EIR must evaluate the SCM's effects in each air district. The Program EIR does, to the maximum extent feasible, analyze the SCM's effects in each air district. For example, in the air quality existing setting section of Chapter III, the Draft Program EIR discusses the current air quality status and different meteorological conditions of the various air basins and regions of the State.

The general cost-effectiveness of the SCM will be addressed in the ARB staff's economic analysis, which will be completed and made publicly available before the Board considers the adoption of the SCM in May 2000. However, it will be up to each air district to decide if the SCM is needed within their jurisdiction. Districts are well-equipped to make this decision, because the districts have undertaken extensive air quality planning to meet their responsibilities under the federal and California Clean Air Acts. It will also be up to each district to decide if the environmental analysis in the Program EIR (as well as the ARB staff's economic analysis) is adequate for use in the district's rulemaking, or if any additional analysis may be necessary to address any factors that are specific to the individual district.

The ARB intends that each district may rely on the Program EIR by incorporating it by reference in whatever CEQA documents a district chooses to prepare for its own architectural coatings rule. For example, a district could use the ARB's SCM Program EIR to provide the basis for an initial study for determining whether the district's version of the SCM may have any significant effects. The district might then decide to prepare a negative declaration (if the district believes that the Program EIR appropriately analyzes the environmental impacts of adopting the SCM in that district) or a focused EIR (if, for example, the district believes that additional analysis may be necessary beyond the analysis contained in the Program EIR, in order to address factors that are specific to the individual district and may not have been fully considered in the Program EIR). Therefore, it will be up to each air district to decide on the best way to comply with CEQA for their particular circumstances. The ARB's SCM Program EIR will simply be available for whatever use the district feels is appropriate.

1-4. Comment: The SCM targets VOC content rather than regulating VOC emissions. VOCs do not contribute equally to ozone formation. Test Method 24 should be modified to be more accurate.

Response: The commenter is referred to the discussion on LVP-VOC in Chapter V of the Draft Program EIR. The More Reactivity section in Chapter IV of the draft Program EIR also contains a discussion of atmospheric chemistry. The ARB staff maintains that VOC content is a good indicator of emissions, since VOCs in architectural coatings are intended to evaporate as the paint dries and forms a film.

With regard to the comment that all VOCs may not contribute equally to ozone formation (*i.e.*, have different reactivities), the commenter is referred to the response to comment #1-1 and the More Reactivity section in Chapter IV.

Regarding the commenter's assertion that Method 24 must be modified to more accurately measure VOC emissions from paints, the commenter is referred to the LVP-VOC section in Chapter V of the draft Program EIR. ARB staff believes that Method 24 is a viable test method for measuring the VOC emissions associated with the VOC content limits advocated in the proposed SCM.

1-5. <u>Comment</u>: Because of the environmental, ecological, and meteorological variations throughout the state, the districts will be unable to rely on the Program EIR as their CEQA document without substantial modifications.

<u>Response</u>: ARB staff disagrees with this comment for several reasons. First, to the maximum extent feasible, the Program EIR does analyze the various environmental, ecological, and meteorological conditions throughout the state. The commenter is referred to the response to comment #1-3.

Second, many of the impact areas (odors, water resources, transportation/circulation, public services, solid waste/hazardous waste, hazards) analyzed will result in the same or similar potential impacts in each air district. In other words, these potential impacts are the same whether they occur in San Diego or Sacramento.

Third, if an air district believes that additional analysis is required for a specific environmental impact area, the air district may decide to tier off the SCM Program EIR and undertake a focused EIR for that specific environmental impact area. Under this approach, the air district's resources could be effectively and efficiently devoted to analyzing this particular impact area, which takes substantially less time than preparing a full, comprehensive EIR. Thus, the Program EIR provides a useful and timesaving tool for aiding air districts in analyzing the environmental impacts associated with the proposed SCM.

1-6. <u>Comment</u>: On page 1-1 to 1-2, the NOP/IS contains the following text,

> "[T]he CEQA Guidelines (see title 14, CCR, §15168) allow a lead agency to prepare a Program EIR for a series of actions that can be characterized as one large project and are related either: (1) geographically, (2) as logical parts in a chain of contemplated actions, or (3) in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program."

Response: The commenter argues that the SCM does not represent one large statewide project but rather a series of smaller projects. The commenter basis its argument on three premises: (1) the NOP states that individual air districts will have to decide the environmental impact of the rule; (2) the SCM may or may not be adopted by individual air districts; and (3) the rule that each air district adopts may differ significantly from the SCM.

The ARB staff disagrees with the commenter's characterization that the SCM amounts to a series of small projects. The project is the use of a model rule to obtain needed VOC emission reductions that will help individual air districts meet SIP requirements and consequently provide California as a whole with cleaner, healthier air. Viewed in this context, the proposed SCM is one large interrelated project.

The commenter also misconstrues the purpose of the Program EIR. As mentioned in the NOP/IS and further expanded upon in Chapter I of the Draft Program EIR, the SCM is designed as a model rule to be adopted by local districts throughout the state of California. For projects such as the ARB's architectural coatings SCM, which is specifically designed to be subsequently adopted by the districts as a local district rule, an environmental analysis in the form of a Program EIR provides the CEQA framework that can be relied upon by the districts when adopting ARB's SCM. With this particular SCM, it is important that the districts be provided with an environmental analysis format that will be consistent with, and more easily incorporated into, their own CEQA compliance process. Using a Program EIR format will accomplish this goal. Therefore, the fact that some air districts might choose to undertake a focused EIR to analyze a specific environmental topic does not undermine the use of the Program EIR or the view that the SCM is one large project.

Furthermore, the fact that an air district has the discretion to adopt the SCM verbatim, adopt a slightly different version of the SCM, or not adopt the SCM at all does not equate to the commenter's implication that the use of a Program EIR is not appropriate. Since the Program EIR takes a worst-case approach in analyzing the impacts associated with the implementation of the SCM on an individual air district basis as well as a statewide basis, as long as the air district's proposed rule is within the scope of the SCM project, the Program EIR can be used as the basis for the air district's CEQA analysis. Thus, an air district's tiering off the ARB's architectural coatings SCM Program EIR to conduct a focused EIR is consistent with CEQA.

It is the position of the California Air Pollution Control Officers Association (CAPCOA) that all California districts should strive to adopt their architectural coatings rule within 12 to 18 months of approval of the SCM by ARB. CAPCOA also recommends that the EIR developed by ARB should be completed and available for the districts to use (CAPCOA, Statement of Principles and Positions on Architectural Coatings Regulations, October 28, 1999).

1-7. Comment: This comment is a continuation of the commenter's mischaracterization of the quoted text shown in response to comment #1-6. The commenter argues that the SCM is not part of a chain of actions (adopting the SCM is at the discretion of each air district) nor is it a continuing program (ARB does not have direct authority to regulate VOCs from architectural coatings).

Response: The ARB disagrees with the commenter's assertion that the project (the SCM as a model rule used to achieve VOC reductions) is not geographically related since it does not take into account the reactivity needs of each air district. As explained in the More Reactivity section of Chapter IV of the Draft Program EIR, the ARB has determined that a mass-based approach to the SCM is an appropriate way to reduce ozone, and that this approach will work throughout California despite any differences in reactivity that may exist in different air basins. The commenter is referred to the response to comment #1-1 for further elaboration on this issue.

Furthermore, the air districts are geographically related. The air districts are in close proximity to one another, within air basins that are situated next to one another, and there is a consequential statewide air quality benefit of VOC reductions obtained in the individual air districts as a result of implementing the SCM in some form.

The SCM is intended to serve as a model rule that will improve the clarity and enforceability of existing district architectural coatings rules, and provide a basis for uniformity among architectural coatings rules in California. The SCM is designed to be considered by air districts in California when adopting or amending architectural coatings rules. The very nature of the SCM allows individual air districts to use their discretion in adopting the SCM in whole or in part. Thus, an air district when adopting the SCM in whole or in part is undertaking an action consistent with the SCM.

Although, under California law, the air districts have the primary legal authority for adopting control measures for architectural coatings (see Health and Safety Code, §§39002, 40000, and 40001), this does not undermine the fact that the SCM is part of an ongoing program. The ARB has had an SCM for architectural coatings in place since 1977, which was amended and updated in 1981, 1984, and 1989. The proposed SCM will revise and update the 1989 SCM to reflect developments in coatings technology that have occurred since 1989. Therefore, this SCM is part of a continuing program, which is intended to serve as a model rule that will improve the clarity and enforceability of existing district architectural coatings rules, provide a basis for uniformity among architectural coatings rules in California, and achieve significant VOC emission reductions statewide.

The ARB disagrees with the commenter's blanket assertion that a Program EIR is not the appropriate CEQA document for the proposed SCM. The CEQA Guidelines, in reference to §15168, indicates that "[t]he program EIR can be used effectively with a decision to carry out a … governmental program or to adopt a … body of regulations in a regulatory program. The program EIR enables the agency to examine the overall effects of the proposed course of action and to take steps to avoid unnecessary adverse environmental effects." The ARB's Draft Program EIR for the architectural coatings SCM is consistent with the spirit of the Program EIR section in the CEQA Guidelines.

1-8. Comment: The desire to maintain uniformity in district architectural coatings rules will overlook the specific reactivity needs of the different airsheds.

Response: This comment is addressed in the response to the previous comment. The commenter is also referred to the response to comment #1-1 for further elaboration on this issue, to the More Reactivity section in Chapter IV, and the discussion of the reactivity-based alternative in Chapter V of the Draft Program EIR.

1-9. Comment: The proposed alternatives listed in the NOP/IS should be included and considered in the Program EIR.

Response: In the Draft Program EIR, ARB staff has reviewed the feasibility of each suggested alternative. One of the alternatives, product line averaging, was considered but has not been incorporated into the SCM. The basis for not including an averaging provision in the SCM at this time is described in Chapter V of the Draft Program EIR. For a detailed discussion of the feasibility of the remaining alternatives listed in the NOP/IS, the commenter is referred to Chapter V of the Draft Program EIR

1-10. Comment: The project alternatives outlined in the NOP/IS, specifically the averaging provision, are necessary for industry to meet the proposed SCM content limits because they provide paint manufacturers with the flexibility to produce high-quality coatings that maintain desired performance characteristics.

Response: At the time the commenter made this comment, the SCM contained both interim and final VOC content limits. Since that time, the SCM has been revised such that it now only contains the interim limits. Based on the ARB's 1998 Architectural Coatings Survey as well as its review of hundreds of compliant product data sheets, a large percentage of low-VOC compliant coatings are now commercially available to meet the proposed interim VOC content limits. Accordingly, the ARB staff believes that an averaging provision is not necessary for coatings formulators to meet the interim VOC content limits. Nonetheless, the ARB staff is considering including an averaging provision in the final SCM. The commenter is also referred to the response to comment #1-9.

1-11. Comment: The ARB should include a technology assessment provision whereby air districts adopting rules based on the SCM would be required to conduct technology assessments prior to the VOC content limits going into effect.

Response: Based on the ARB's 1998 Architectural Coatings Survey as well as its review of hundreds of compliant product data sheets, a large percentage of low-VOC compliant coatings are now commercially available to meet the proposed interim VOC content limits. The commenter is referred to the response to comment #1-10.

Even though the ARB staff believes that compliant coatings are available to meet the SCM limits, we are committed to working with the SCAQMD, other interested districts, and the architectural coatings industry as they conduct technology assessments of the future VOC limits for the following coatings categories in the SCAQMD's Rule 1113: flats; floor coatings; IM coatings; nonflats; primers, sealers, and undercoaters; quick-dry enamels; quick-dry primers, sealers, and undercoaters; rust preventative coatings; stains; and waterproofing sealers for wood. These technology assessments will be completed one year prior to the implementation dates for the revised standards. Since the ARB staff will be conducting the assessments, we do not believe that it is necessary to include a technology assessment provision in the SCM, which is designed for adoption as a district rule. After each technology assessment, the ARB staff will report the results to the staff of each district, and district staff can then report to their District Governing Boards as to the appropriateness of maintaining the applicable future VOC limits.

1-12. Comment: The Program EIR should evaluate the possibility that limiting solvent content in coatings formulations may actually increase the formation of ground-level ozone. Furthermore, a reactivity-based regulatory approach is consistent with the mandates of the federal Clean Air Act (section 183(e)).

Response: The Draft Program EIR comprehensively evaluates the potential negative ozone reactivity of coatings reformulations as well as a reactivity-based VOC regulatory approach. The commenter is referred to the More Reactivity section of Chapter IV and the discussion of the reactivity-based alternative in Chapter V in the Draft Program EIR, as well as responses to comments #1-1 and #1-4.

1-13. Comment: The commenter indicates that it has developed/obtained data that supports a reactivity-based SCM.

Response: To date, the commenter has not shared this information with the ARB staff. The commenter is referred to the More Reactivity section of Chapter IV and the discussion of the reactivity-based alternative in Chapter V in the Draft Program EIR as well as responses to comments #1-1 and #1-4.

1-14. Comment: The ARB should not take a statewide regulatory approach, but rather tailor the SCM to optimize environmental benefits and costs associated with regional differences.

Response: ARB staff assumes that the commenter is addressing the NOP/IS alternative, Regional Deregulation. As explained in Chapter V of the Draft Program EIR, the ARB staff finds that this alternative is not feasible. Briefly, the reasons for this determination are: (1) it would be extremely difficult, if not impossible, to determine the effectiveness of such an alternative, and (2) such an approach would have severe enforcement problems.

1-15. Comment: Because the SCAQMD could not measure VOC reductions from a source as small as the architectural coatings category in its UAM modeling, implementation of the SCM may not result in a measurable reduction in ozone formation.

Response: The ARB staff disagrees with the commenter's assertion that limiting the VOC content of architectural coatings may not reduce ozone formation. The commenter is referred to the More Reactivity section of Chapter IV in the Draft Program EIR, as well as responses to comments #1-1 and #1-4.

The fact that the SCAQMD's UAM may not have demonstrated measurable changes in ozone formation from reducing the VOC content of architectural coatings does not mean that the proposed SCM will not reduce VOCs that contribute to ozone formation. The UAM is a photochemical grid model that numerically simulates the effects of emissions, advection, diffusion, chemistry, and surface removal processes on pollutant concentrations within a three-dimensional grid. Because the model is designed to estimate ozone effects for a particular air basin, the sensitivity of the model is such that a specific emissions category may not make a measurable change when varied in the model. Further, ambient air quality data over the last 20 years indicates that reductions in VOC emissions along with reductions in NO_x emissions contribute to lower ozone levels. Thus, the ARB staff will continue to pursue a mass VOC-based regulatory approach, as described in the proposed SCM, for obtaining needed VOC reductions from architectural coatings.

1-16. Comment: The air quality analysis contained in the Program EIR should also consider the levels of ozone nonattainment in the 35 different California air districts.

Response: The ARB staff has considered the ozone attainment status of each of the 15 air basins containing California's 35 air districts. The commenter is referred to the Air Quality sections of Chapters III and IV in the Draft Program EIR as well as the responses to comments #1-3 through #1-6.

1-17. Comment: The NOP/IS states that there is no possibility that there will be a significant (negative) impact on air quality; this is inconsistent with the statements in the NOP/IS that the "seven deadly sins" will be analyzed.

Response: The ARB staff assumes that the commenter is referring to the impacts on air quality section of the environmental checklist in which no impact was identified for a "...cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment...." A definitive statement would be premature until the appropriate air quality analysis is completed, but focusing on the word "considerable," we believe that there will be no "considerable" impact on criteria pollutants. In the NOP/IS, air quality was identified as one of the six potential impact areas that would be analyzed in the Draft Program EIR. The NOP/IS further indicated that the ARB staff would analyze the air quality issues raised by industry in the past (the "seven deadly sins" and reactivity). This comprehensive analysis is contained in Chapter IV of the Draft Program EIR. The analysis reveals that overall the proposed SCM will achieve significant VOC emission reductions.

If the commenter’s “negative impacts on air quality” statement is in reference to reactivity, the commenter is referred to the More Reactivity section of Chapter IV in the Draft Program EIR, as well as responses to comments #1-1 and #1-4.

COMMENT LETTER #2
Sherwin Williams
July 21, 1999

2-1. Comment: The commenter states that the Program EIR should be delayed until the proposed SCM is finalized.

Response: The comment is noted. Based on comments received to date from industry and air districts, the ARB staff has modified the proposed SCM. The modifications in the proposed SCM reflect changes in the ARB staff's focus and timetable regarding the date of approval and the scope of the SCM. To this end, the revised proposed SCM does not include the final VOC content limits. Only the January 1, 2003, limits (interim limits) are included (except for IM coatings, which have a January 1, 2004, effective date).

The basic reason for addressing only the interim limits at this time is due to the need to focus limited staff resources on the technical, environmental, and economic issues associated with adoption of the interim limits.

2-2. Comment: Specific variations on the proposed VOC content limits and final compliance deadlines should be considered as one of the proposed alternatives in the Draft Program EIR.

Response: The comment is noted. The ARB staff has included alternatives that have varying VOC content limits and/or varying compliance deadlines. These alternatives are comprehensively analyzed pursuant to CEQA in Chapter V of the Draft Program EIR. The Final Program EIR for the proposed SCM will be provided to ARB's Board prior to the public meeting for its consideration of the proposed SCM. It is ultimately the Board's decision whether to adopt the proposed project or one of the feasible project alternatives. This decision will be based upon the information contained in the Final Program EIR, the staff report for the architectural coatings SCM (which will include the staff's economic impact analysis), and comments received from the public during the public meeting.

2-3. Comment: The commenter supports the low vapor pressure, VOC content limits/final compliance deadlines, and regional deregulation alternatives.

Response: The ARB staff reviewed these alternatives and concludes that the low vapor pressure and regional deregulation alternatives are infeasible. However, the VOC content limits/final compliance deadlines alternative is considered a feasible alternative. The commenter is referred to Chapter V of the Draft Program EIR, as well as responses to comments #1-9 and #2-2.

2-4. Comment: The commenter notes that it has reservations concerning the inclusion of a performance-based standard alternative, indicating that because of the different manufacturers' standards for different substrates this alternative would be unenforceable.

Response: The ARB staff agrees with the commenter's observations and has concluded that this alternative is infeasible. The commenter is referred to Chapter V of the Draft Program EIR as well as the response to comment #1-9.

2-5. Comment: The commenter notes that it has reservations concerning the inclusion of a reactivity-based regulatory alternative because accurate reactivity data on architectural coatings VOCs have not been developed. The commenter indicates that it would be impractical to suggest that a manufacturer create unique coatings formulations for different air districts with different reactivity configurations (VOC:NO_x ratios).

Response: The ARB staff agrees that additional data are needed for a reactivity-based alternative. The commenter is referred to Chapter V of the Draft Program EIR, as well as the response to comment #1-9.

2-6. Comment: The commenter notes that it has reservations concerning the inclusion of a product line averaging alternative, indicating that because of the inconsistent reporting and recordkeeping requirements of air districts, the alternative is ultimately impractical.

Response: The ARB staff disagrees that the reporting and recordkeeping requirements that could be adopted by the air districts make this alternative infeasible. The ARB staff believes that the proposed SCM will provide consistency throughout the state for those air districts that undertake to adopt, or modify, an existing architectural coatings rule. The inclusion of an averaging provision would provide consistency throughout the state. Although an averaging provision is not necessary because many low-VOC compliant coatings are currently available to meet the proposed SCM VOC content limits, the ARB staff is considering including an averaging provision in the final SCM. The commenter is referred to Chapter V of the Draft Program EIR, as well as responses to comments #1-9 and #1-10.

2-7. Comment: The commenter notes that it has reservations concerning the inclusion of a seasonal regulation alternative, indicating that because of the stocking/unstocking/restocking costs to retailers, distributors, and manufacturers, this alternative is ultimately impractical.

Response: The ARB staff agrees with the commenter's observations and has concluded that the seasonal regulation alternative is infeasible. The commenter is referred to Chapter V of the Draft Program EIR, as well as the response to comment #1-9.

2-8. Comment: If a performance-based standard, reactivity-based approach, product line averaging, and seasonal regulation alternative are included in the SCM, the Program EIR will need to consider the effects of each.

Response: Since the ARB staff has found the performance-based standard, reactivity-based approach, and seasonal regulation alternatives to be infeasible, under CEQA it is not necessary to consider the environmental impacts of these alternatives. The commenter is referred to responses to comments #2-4 through #2-7.

The product line averaging alternative may be included as part of the final SCM. The environmental impacts associated with this provision have been analyzed pursuant to CEQA in Chapter V of the Draft Program EIR.

2-9. Comment: The stain category should be broken down into three subcategories: interior semi-transparent, exterior semi-transparent, and interior and exterior opaque.. These subcategories should be included in the Program EIR since it is likely that some or all of them could be included in the final SCM to allow the maximum VOC reduction with the minimum environmental harm and expense.

Response: Compliant interior and exterior coatings are currently available for semi-transparent stains. Opaque (semi-solid) stains are typically manufactured for exterior use only. However, compliant stains are available for both types of stains. Different interior and exterior VOC limits for the same category substantially impact the enforceability of a rule, especially in cases where the same formulation is recommended for dual uses. For example, 18 percent of the semi-transparent stains are recommended for both interior and exterior, or dual, usage. The commenter is referred to the summary table (Table IV-2) of Chapter IV and Appendix E of the Draft Program EIR.

2-10. Comment: The industrial maintenance (IM) category should be broken down into subcategories. These subcategories should be included in the Program EIR since it is likely that some or all of them could be included in the final SCM to allow the maximum VOC reduction with the minimum environmental harm and expense.

Response: Various commenters have suggested a number of subcategories for IM coatings. The proposed SCM does contain some subcategories from the IM category such as high temperature coatings, antifouling coatings, temperature-indicator safety coatings, antenna coatings, rust preventative coatings, and others, all with a higher VOC limit proposed than for IM coatings.

The ARB staff has found compliant coatings for each of the IM coating categories suggested by the commenter, and has analyzed the lower-VOC technologies for a variety of uses. The low- and zero-VOC IM coatings are recommended for a variety of industrial uses, including but not limited to refineries; bridges; pipelines; and chemical, food processing, pulp and paper manufacturing, and wastewater treatment facilities. The ARB staff has also considered data submitted by other commenters. The commenter is referred to the summary table (Table IV-2) of Chapter IV and Appendix E of the Draft Program EIR.

However, the ARB staff is proposing to delay the effective date of the 250 g/l VOC limit for IM coatings until January 1, 2004. This additional time will allow industry and other organizations to conduct their own technology assessments of zero- and low-VOC coatings for various types of uses.

2-11. Comment: The primer, sealer, and undercoater (PSU) category should be broken down into subcategories. These subcategories should be included in the Program EIR since it is likely that some or all of them could be included in the final SCM to allow the maximum VOC reduction with the minimum environmental harm and expense.

Response: As indicated by product labels and product data sheets, many of the products in the primer, sealer, undercoater category are intended for use on interior and exterior surfaces. The 1998 ARB survey indicates that 41 percent of the products reported in this category are for interior use, 31 percent are for exterior use, and 28 percent can be used on either interior or exterior surfaces. For the sealer category, which was surveyed separately, the survey indicates that 61 percent of the products are for interior use, 26 percent are for exterior use, and 14 percent can be used on either interior or exterior surfaces. Further, the trend for multi-use products has resulted in products for which there is no clear-cut distinction between products that seal and products that prime or undercoat. Subcategorization of the primer, sealer, undercoater category into exterior and interior and sealer vs. primer or undercoater would create artificial categories for which very few products exist. The commenter is referred to the summary table (Table IV-2) of Chapter IV and Appendix E of the Draft Program EIR.

We are, however, recommending one subcategorization of PSU, “Specialty Primers” with a VOC limit of 350 g/l. This category covers specific coatings labeled and formulated for sealing fire, smoke or water damage; blocking stains, odors, or efflorescence; or for conditioning excessively chalky substrates. The SCM contains specific labeling requirements for this category and also requires manufacturers to report annually to ARB on the number of gallons of specialty primers sold in the state.

2-12. Comment: The nonflat category should be broken down into subcategories. These subcategories should be included in the Program EIR since it is likely that some or all of them could be included in the final SCM to allow the maximum VOC reduction with the minimum environmental harm and expense.

Response: Information on market shares from the ARB survey indicates that a considerable portion of existing interior and exterior low and medium gloss coatings already comply with the proposed limit. Our survey of product information sheets for complying low and medium gloss coatings shows that a variety of performance characteristics comparable to those of higher VOC products have been achieved for both interior and exterior coatings.

Available evidence does not support creation of a separate subcategory for high gloss coatings. While the market share for high gloss coatings that comply with the proposed limit is lower than the corresponding market shares for low and medium gloss coatings, technology for formulating complying high gloss coatings is available from some resin manufacturers and is being developed by other manufacturers. We believe that the proposed effective date of January 1, 2003, will allow sufficient time for the formulation of complying high gloss products that are comparable to higher VOC products over a broad range of performance characteristics. The commenter is referred to the summary table (Table IV-2) of Chapter IV and Appendix E of the Draft Program EIR.

2-13. Comment: The flats category should be broken down into subcategories. These subcategories should be included in the Program EIR since it is likely that some or all of them could be included in the final SCM to allow the maximum VOC reduction with the minimum environmental harm and expense.

Response: We do not believe that further subcategorization of flats is necessary. Our technical evaluation found a wide variety of product types in the flat coatings category that already comply with the proposed limit of 100 g/l. The ARB staff has found compliant flats for a variety of uses, including interior and exterior uses. A variety of performance characteristics are available for both interior and exterior products at VOC levels at or below 100 g/l. The commenter is referred to the summary table (Table IV-2) of Chapter IV and Appendix E of the Draft Program EIR.

2-14. Comment: Because the proposed SCM limits involve the extensive use of waterborne technologies, the Draft Program EIR should analyze the potential depletion of groundwater supplies and lowering of the water table from both their manufacture and from the need for more surface preparation (power washing).

Response: The Draft Program EIR comprehensively analyzes the potential water demand impacts associated with implementation of the proposed SCM. The analysis reveals that water demand impacts are negligible and insignificant. The commenter is referred to the Water section of Chapter IV in the Draft Program EIR.

ARB staff evaluated hundreds of conventional and low-VOC coatings product data sheets (see tables in Appendix E and the summary table in Chapter IV of the Draft Program EIR). The product data sheets indicated that low-VOC coatings do not require substantially different surface preparation, including power washing, than conventional coatings. As a result, it is not anticipated that power washing as a method of surface preparation will increase substantially as a result of implementing the proposed SCM.

2-15. Comment: Because the proposed SCM limits involve the extensive use of waterborne technologies, the Draft Program EIR should analyze the environmental effects of increased wastewater generation and the need for new or expanded wastewater treatment facilities.

Response: The Draft Program EIR comprehensively analyzes the potential water quality impacts associated with implementation of the proposed SCM. The analysis reveals that wastewater impacts associated with the cleanup of waterborne coatings are negligible and insignificant. The commenter is referred to the Water Impacts section of Chapter IV in the Draft Program EIR.

2-16. Comment: The seasonal regulation alternative could lead to increased traffic as a result of additional vehicles and trips needed to transport coatings stock between retailer, distributor, and manufacturer.

Response: The ARB staff has found that the seasonal regulation alternative is infeasible. Therefore, no further environmental impact analysis is required for this alternative under CEQA. The commenter is referred to Chapter V of the Draft Program EIR.

2-17. Comment: The seasonal regulation alternative could lead to increased usage of energy and mineral resources (gasoline) as a result of additional vehicles and trips needed to transport coatings stock between retailer, distributor, and manufacturer.
Response: The ARB staff has found that the seasonal regulation alternative is infeasible. Therefore, no further environmental impact analysis is required for this alternative under CEQA. The commenter is referred to Chapter V of the Draft Program EIR, as well as the response to comment #1-9.

2-18. Comment: If a category labeling requirement is adopted, potential energy/mineral resources impacts could occur due to coatings formulators having to make new labels for 26 air districts, especially to reflect rule amendments which may occur multiple times each year.

Response: In the version of the SCM presented in the NOP/IS, subsection 4.1.4 required that each coating container list the applicable coating category in Table of Standards in the rule. That provision has now been removed, and no further analysis is required under CEQA.

2-19. Comment: The handling of hazardous materials within ¼ mile of a school should be analyzed in the Draft Program EIR. The possible use of coatings containing acetone (which is highly flammable), glycol ethers, and/or diisocyanates used in the neighborhood of a school, as well as on school structures themselves, should not be ignored.

Response: The Draft Program EIR extensively analyzes the hazards and human health impacts associated with the use of traditional and replacement solvents, including acetone, glycol ethers, and diisocyanates, for the proposed SCM. In the context of acetone, the Draft Program EIR analyzes the flammability of this potential replacement. The commenter is referred to the Public Services and Hazards sections of Chapter IV in the Draft Program EIR.

2-20. Comment: Because the proposed VOC limits in the SCM will essentially eliminate the use of mineral spirits and will dramatically increase the market share of waterborne coatings, it is reasonable to assume that there will be an increase in the use of ethylene glycol ethers and ethylene glycol ether acetates. The commenter notes that the Draft Program EIR must analyze the health effects of this switch in solvents.

Response: The Draft Program EIR extensively analyzes the issue raised by the commenter. In its review of traditional and low-VOC coatings (see the tables in Appendix E of the Draft Program EIR), the ARB staff noted that manufacturers are moving away from formulating low-VOC coatings with hazardous materials when possible, for example, using Texanol®, propylene glycol, and ethylene glycol in lieu of more hazardous glycol ethers such as EGBE, EGME, and EGEE. The commenter is referred to the Human Health Impacts section in Chapter IV of the Draft Program EIR for a more complete discussion of hazards impacts associated with both conventional and replacement solvents.

2-21. Comment: Because the proposed SCM will require the use of waterborne technologies, more surface preparation in the form of sandblasting will be required. This in turn will increase the public's exposure to crystalline silica, a Proposition 65 carcinogen. Sandblasting can also occur at a school as well as within ¼ mile of a school. Because architectural coatings used in residential settings will require more abrasive blasting than is currently the case, and such settings may expose children to these hazards, these impacts need to be considered. The lack of solvent borne primers is especially critical, because currently they can serve as a preparatory step prior to the application of a waterborne topcoat.

Response: The Draft Program EIR analyzes the potential for increased sandblasting and exposure to crystalline silica. ARB staff concludes that low-VOC coatings do not require substantially different surface preparation than conventional coatings. Thus, implementing the SCM is not anticipated to result in increased sandblasting activity. Furthermore, existing State law applicable to abrasive blasting minimizes public exposure to fine inhalable particles, including crystalline silica. The commenter is referred to the Air Quality and Human Health sections in Chapter IV of the Draft Program EIR.

With regard to the need for solvent-borne primers, the proposed SCM includes two primer categories that may contain solvent-borne primers—specialty primers with a VOC limit of 350 g/l, and quick-dry primers, sealers, and undercoaters with a VOC content of 200 g/l.

2-22. Comment: Since the proposed SCM will require the use of waterborne technologies, more surface preparation in the form of power washing and abrasive blasting will be required, which in turn will generate noise. Because architectural coatings used in residential settings will require more surface preparation than is currently the case, children may also be exposed to excessive noise. The lack of solvent-borne primers is especially critical, because currently they can serve as a preparatory step prior to the application of a waterborne topcoat. It is expected that a substantial temporary, periodic, or permanent increase in ambient noise levels will occur and should be evaluated in the Draft Program EIR.

Response: ARB staff concludes that low-VOC coatings do not require substantially different surface preparation than conventional coatings. Therefore, implementation of the proposed SCM is not anticipated to result in a substantial increase in power washing or sandblasting as a method of surface preparation. For these reasons, implementation of the proposed SCM is not anticipated to result in significant noise impacts. The commenter is referred to the Air Quality and Impacts Found Not to be Significant sections in Chapter IV of the Draft Program EIR.

2-23. Comment: Because the proposed SCM will force the use of waterborne technologies, there will be public services impacts. In particular, the commenter asserts that waterborne coatings must be applied in warmer and drier months and applied more often, thus reducing the availability of public facilities, especially parks.

Response: The ARB staff disagrees with the commenter's assertion regarding waterborne coatings. Based upon NTS data and the dry time and qualitative durability descriptions in the coatings product data sheets, staff concluded that low-VOC coatings have dry time and durability characteristics comparable to conventional coatings, and that therefore the SCM will not adversely impact the maintenance of public facilities. Thus, the ARB staff anticipates that implementation of the proposed SCM will not result in significant public services impacts. The commenter is referred to the Public Services section and Table IV-2 in Chapter IV of the Draft Program EIR, and to the tables in Appendix E,

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2-24. Comment: Because the proposed SCM will require the use of waterborne technologies, more surface preparation in the form of sandblasting will be required. This in turn will increase the amount of wastes deposited in landfills. The commenter also asserts that the proposed VOC content limits for IM coatings will eliminate the use of single component systems, which will lead to the use of two-component systems. These systems, according to the commenter, have limited pot lives; once the pot life is exceeded, the material is waste. Thus, the increased use of multi-component systems can result in increased generation of solid and hazardous wastes.

Response: Wastes generated from sandblasting are not anticipated to increase substantially for the same reason identified in the response to comment #2-21. Consequently, implementing the proposed SCM is not expected to result in significant solid waste impacts from sandblasting. Regarding pot life, the ARB staff's review of currently available, multi-component low-VOC coatings revealed that pot-life problems are not anticipated. These issues are discussed in Chapter IV of the Draft Program EIR. However, based on the commenter's and others' comments, the Draft Program EIR includes an analysis of potential solid waste impacts related to pot-life problems in multi-component low-VOC compliant coatings. This analysis also evaluates shelf-life and freeze-thaw problems associated with low-VOC compliant coatings. The commenter is referred to the Solid Waste/Hazardous Waste section of Chapter IV in the Draft Program EIR.

2-25. Comment: Due to the unavailability of traditional coatings technologies, maintenance of historical buildings will be more difficult, at a minimum, and in the worst case, the historical and physical integrity of these structures may be jeopardized. This is especially problematic with the elimination of solvent borne primers, as well as for the second tier reductions of flat and nonflat coatings to 50 g/l. As a result, implementation of the proposed SCM could result in aesthetics and cultural resources impacts.

Response: The ARB staff does not agree that significant aesthetics and cultural resources impacts will occur as a result of more difficulty in maintaining historic buildings. Based upon the staff's comprehensive investigation of commercially available low-VOC compliant products, performance characteristics of existing and reformulated products should be sufficient to meet the maintenance needs of historical structures. Thus, the ARB staff anticipates that the proposed SCM will not result in significant aesthetics and/or cultural resources impacts. The commenter is referred to the Impacts Found Not To Be Significant section and the summary table (Table IV-2) in Chapter IV of the Draft Program EIR, as well as the tables in Appendix E.

The ARB staff also notes that the original proposal has been modified to exclude the final VOC content limits of 50 g/l for the flat and nonflat coatings categories. The commenter is referred to the response to comment #2-1.

COMMENT LETTER #3
National Paint & Coatings Association (NPCA)
July 22, 1999

The commenter has attached and incorporated by reference two other comment letters. The first letter labeled as Appendix A was the commenter's NOP/IS comment letter submitted during the SCAQMD's 1999 amendments to its Rule 1113 – Architectural Coatings. For the relevant parts of the comment letter that are applicable to the ARB's proposed SCM, the ARB staff has provided a detailed response. For example, where the comment refers to the District or SCAQMD, the ARB staff will assume these terms mean the ARB. Where the comment is specific to the SCAQMD's Rule and has no relevance to the ARB's proposed SCM, no response is provided. The commenter is referred to the responses to comments #3-13 through #3-30.

The second letter, labeled as Appendix B, was submitted to the ARB prior to the NOP/IS comment period. The commenter is referred to the responses to comments #3-31 through #3-35.

3-1. Comment: There is no need for the SCM to specify compliance dates since the SCM is only a model rule and notes that a more reasonable approach would be to specify time frames when it is believed that the technology will be available to meet lower VOC limits.

Response: The ARB staff disagrees that there is no need to specify compliance dates. Compliance dates are needed to provide for uniform implementation of architectural coatings rules throughout the State. Consistent compliance dates will also allow for a statewide averaging provision if one is included in the final SCM.

3-2. Comment: Industry will not be able to develop effective coatings at the proposed VOC content limits; more time is needed for technology development.

Response: The ARB staff disagrees that more time is needed for technology development. Based on the ARB staff's comprehensive and extensive investigation of low-VOC compliant products, ARB staff believes that the 2003 VOC content limits, 2004 for IM coatings, are technologically feasible (see tables in Appendix E and the summary table in Chapter IV of the Draft Program EIR). However, the Draft Program EIR contains project alternatives that have varying VOC content limits and compliance dates (*e.g.*, 2004). The commenter is referred to Chapter V of the Draft Program EIR.

3-3. Comment: The Program EIR should evaluate the implementation of the first VOC content limits in the year 2004; the final limits should be considered based on an increments of progress approach.

Response: With regard to the comment that the first VOC limit should be implemented in the year 2004, the commenter is referred to the response to comment #3-2.

Regarding the final VOC content limits, the ARB staff has revised the SCM since the release of the NOP/IS to include only the interim limits, which will take effect in 2003 (2004 for IM coatings). The commenter is referred to the response to comment #2-1.

3-4. Comment: The Program EIR should evaluate the suggestions made concerning the SCM in the commenter's June 7, 1999, letter, which the commenter incorporates by reference.

Response: The ARB staff has specifically addressed the commenter's suggestions in the responses to comments #3-31 through #3-35.

3-5. Comment: Implementation of the SCM may result in a lack of effective coatings for many current applications; the Program EIR should evaluate this impact on the projected VOC emission reductions.

Response: The ARB staff has analyzed the impact of allegedly ineffective low-VOC coatings. There is currently a wide range of commercially available coatings that meet the proposed VOC content limits in the SCM (see tables in Appendix E and the summary table in Chapter IV of the Draft Program EIR). Additionally, the results of the SCAQMD's NTS study support these findings. The laboratory results of the SCAQMD's NTS study reveal that there are currently available coatings that comply with the proposed VOC content limits and which have coating and durability characteristics comparable to existing high-VOC coatings. Thus, the proposed SCM should achieve significant VOC emission reductions throughout the state.

3-6. Comment: The commenter concurs with the consideration of alternatives listed in the NOP/IS, including the different VOC content limits and compliance deadlines alternative.

Response: The ARB staff has analyzed all the alternatives listed in the NOP/IS and has concluded that the only feasible alternative is the varying VOC content limits/compliance deadlines alternative. The commenter is referred to Chapter V of the Draft Program EIR as well as the response to comment #2-2.

3-7. Comment: The commenter agrees that the SCM could have a significant effect on the environment and with the need to prepare a Program EIR.

Response: The ARB staff has prepared a comprehensive and detailed Draft Program EIR that evaluates the potential environmental impacts associated with implementation of the proposed SCM. The Draft Program EIR concludes that the proposed SCM will not result in any significant impacts.

3-8. Comment: The commenter asserts that significant costs are associated with the implementation of the SCM, and agrees that costs should be evaluated in an economic impact analysis contained in the Staff Report rather than in the Program EIR.

Response: The ARB staff will conduct an extensive economic impact analysis and will include it in the Staff Report for the architectural coatings SCM. The economic impact analysis will consider reformulation costs as well as the impacts on the profitability (return on the owners equity) of the architectural coatings industry. As part of this effort, ARB staff is conducting a survey on cost impacts.

3-9. Comment: The Program EIR must analyze water quality impacts if lower VOC coatings are required for the water and sewage system infrastructures. Water quality impacts could also result from the release of hazardous materials due to the failure of tank lining and piping coatings.

Response: Based upon the ARB staff's comprehensive and extensive review of the product information sheets obtained from resin manufacturers and coatings formulators, there is currently a wide range of IM coatings, including tank lining coatings, that are commercially available to meet the proposed SCM VOC content limits (see tables in Appendix E and the summary table in Chapter IV of the Draft Program EIR). Additionally, the results of the SCAQMD's NTS study support these findings. The laboratory results of the SCAQMD's NTS study reveal that there are currently available IM coatings that comply with the proposed VOC content limits and which have coating and durability characteristics comparable to existing high-VOC coatings. Thus, water quality impacts from the alleged failure of tank lining coatings is not expected to occur. The commenter is referred to responses to comments #3-34 and #3-35.

3-10. Comment: The Program EIR must analyze aesthetic impacts from the elimination of the anti-graffiti coatings category.

Response: The ARB staff has found both permanent and sacrificial anti-graffiti systems that comply with the proposed SCM VOC content limits. Based on the availability of these coatings and others, the ARB staff anticipates that the anti-graffiti coatings category will not be eliminated and that implementation of the SCM will not result in significant aesthetic impacts.

3-11. Comment: The Program EIR must analyze impacts associated with the potential failure of IM coatings to meet infrastructure needs at recreational facilities.

Response: The ARB staff's independent investigation reveals that there are commercially available low-VOC compliant IM coatings with comparable performance characteristics as traditional coatings. Based on this analysis, the ARB staff has determined that implementation of the proposed SCM will not create significant recreational impacts. The commenter is referred to Appendix E and the summary tables in Chapter IV of the Draft Program EIR. The commenter is also referred to the "Environmental Impacts Found Not to Be Significant" section in Chapter IV of the Draft Program EIR.

3-12. Comment: The Program EIR must analyze solid waste/hazardous waste impacts associated with increased disposal of two-pack (two-component) coatings systems.

Response: Chapter IV of the Draft Program EIR includes an analysis of potential impacts to landfills from the use of two-component coatings systems. The analysis concludes that, even taking into consideration as a "worst-case" the disposal of some coatings due to pot life problems, implementation of the proposed SCM will not result in significant solid waste/hazardous waste impacts. The commenter is referred to the Solid Waste/Hazardous Waste section of Chapter IV in the Draft Program EIR.

3-13. Comment: The SCM is moving forward before all the necessary data (*e.g.*, NTS study) are available to make an informed decision.

Response: Although it is true that the field portion of the NTS study is ongoing, the proposed SCM is not dependent on this study. The ARB staff conducted a comprehensive survey of currently available coatings that forms the primary basis for the proposed SCM. ARB staff also conducted literature reviews and held discussions with manufacturers and resin suppliers. In addition, ARB staff evaluated hundreds of coatings product data sheets from many resin manufacturers and coating formulators and considered the following coatings characteristics: VOC content, percent solids by volume, coverage, adhesion, durability, pot life, shelf life, gloss, and drying time. Based on this analysis, the ARB staff has determined that low-VOC compliant coatings are technically feasible and commercially available with performance characteristics comparable to traditional coatings.

3-14. Comment: The SCM should be postponed until the NTS study and ARB's 1998 Architectural Coatings Survey are completed.

Response: At the time of this commenter's letter, the ARB's 1998 survey was not yet published in final form and the SCM was scheduled for Board consideration in November 1999. However, at this time, both the laboratory phase of the NTS study as well as the ARB's 1998 Survey are completed. The ARB's consideration of the proposed SCM has been rescheduled from November 1999 to May 2000.

3-15. Comment: The NTS study should be expanded to include real world weathering and durability studies.

Response: The NTS study does include real-time exposure tests that will be conducted in three locations within the South Coast Air Basin, including El Segundo, Saugus, and Fullerton. This testing is ongoing.

3-16. Comment: There must be a thorough evaluation of low-VOC technology before it can be mandated as feasible for all applications.

Response: The proposed SCM does rely on a thorough evaluation of low-VOC coatings technology. Based on the ARB staff's review of resin manufacturers' and coating formulators' product information sheets, which includes weatherability data, low-VOC coatings with performance characteristics comparable to traditional coatings are available to meet the proposed SCM VOC limits (see tables in Appendix E and the summary table in Chapter IV of the Draft Program EIR). This is further supported by the results of the ARB's 1998 Architectural Coatings Survey. Also see the response to comment #3-13.

The ARB staff has held seven public workshops (May 27 and August 20, 1998; March 30, June 3, July 1, September 8, and December 14, 1999) where industry, the public, air districts, and the U.S. EPA have had an opportunity to express their concerns with the proposed SCM. Furthermore, ARB staff has met individually with specific industry members, as well as air districts, to further understand their particular concerns. As a result of input received from the public workshops and individual meetings, staff has made revisions to the proposed SCM. Accordingly, the SCM development process can be characterized as, "…a thorough, open minded, and objective evaluation of existing and reasonably foreseeable coatings technologies in setting future VOC limits."

3-17. Comment: The National AIM Rule should be adopted as a template for the SCM, recognizing that where lower limits are proposed, further breakout categories may be required.

Response: The ARB staff has extensively analyzed the National AIM Rule's categories and definitions, as well as the VOC limits. As a result of this analysis, the ARB staff is recommending the addition of three of the National Rule categories that are not found in any districts' rules: antenna coatings, flow coatings, and anti-fouling coatings. The VOC limit for antenna coatings is the same as that in the National Rule, while the limits for flow coatings and anti-fouling coatings are slightly lower than those in the National Rule, based on VOC contents of existing products being sold in California. ARB staff believes that adding additional categories into the rule is not necessary at this time for the reasons discussed in Appendix D of the Draft Program EIR. Also, for most of the unique National Rule categories, no specific comments requesting their inclusion were received. Appendix D identifies the category and the VOC limit that these unique National Rule categories fit into.

The National Rule contains separate categories for interior and exterior flats and nonflats, with the same VOC limit. This does not add any simplicity to the rule, just redundancy, and only one limit is being proposed for each of these coatings categories in the SCM. The ARB staff has created two new coating categories that were found in the National Rule, floor coatings and rust preventative coatings. While the proposed VOC limit for rust preventative coatings is that same as the limit in the National Rule, the proposed VOC limit for floor coatings is lower than that of the National Rule, based on the VOC contents of coatings sold in California.

Two further breakout categories resulted from the public process that were in neither the National Rule nor Rule 1113. We broke out temperature-indicator safety coatings from high temperature coatings, and clear brushing lacquers from lacquers. Both of these are small categories that required a higher VOC limit because reformulation is impractical (because of small volume or for technical reasons) at this time.

3-18. Comment: The NOP/IS lists seven alternatives that will be analyzed in the Program EIR.

Response: The ARB staff has analyzed all of the alternatives listed in the NOP/IS and has concluded that the only feasible alternative is the varying VOC content limits/compliance deadlines alternative. The commenter is referred to Chapter V of the Draft Program EIR as well as the response to comment #2-2.

3-19. Comment: A low vapor pressure alternative may have only limited impact on the ability of manufacturers to meet the VOC limits in the proposed SCM.

Response: The ARB staff has evaluated the low vapor pressure alternative and has found this alternative infeasible. The commenter is referred to Chapter V of the Draft Program EIR as well as the response to comment #2-2.

3-20. Comment: A performance-based alternative is fraught with numerous problems and controversies, with the exception of IM coatings, which are certified to meet a specific set of performance standards.

Response: The ARB staff has found the performance-based alternative infeasible. The IM category is a broad category with differing performance criteria depending on the type of application. The commenter is referred to Chapter V of the Draft Program EIR as well as the response to comment #2-2.

3-21. Comment: A reactivity-based alternative may provide additional flexibility to coatings manufacturers, depending on how it is employed. The commenter supports continued evaluation and research of this alternative.

Response: The comment is noted. The ARB is committed to evaluating the feasibility of reactivity-based regulations for certain source categories, including architectural coatings, to determine if, in the future, reactivity-based limits can be developed. The commenter is referred to Chapter V of the Draft Program EIR as well as responses to comments #1-1 and #2-2.

3-22. Comment: A product line averaging alternative may offer added flexibility for the manufacturer in meeting the proposed VOC limits.

Response: The ARB staff concurs and for this reason is considering including a product line averaging option in the final SCM. The commenter is referred to Chapter V of the Draft Program EIR, as well as responses to comments #1-9, #1-10, and #2-2.

3-23. Comment: A regional deregulation alternative is the most difficult to evaluate, as it depends on an anticipated fundamental change in the VOC/NO_x ratios throughout the State.

Response: The ARB staff has evaluated a regional regulation alternative and found this alternative infeasible. The commenter is referred to Chapter V of the Draft Program EIR as well as responses to comments #1-9 and #2-2.

3-24. Comment: A seasonal alternative appears attractive, but the commenter is concerned with how such an approach would be implemented.

Response: The ARB staff has evaluated a seasonal regulation alternative and found this alternative infeasible. The commenter is referred to Chapter V of the Draft Program EIR, as well as responses to comments #1-9 and #2-2.

3-25. Comment: The current proposed limits are not technically and economically feasible. The ARB should postpone adoption of the SCM until the completion of the NTS study and ARB's 1998 Architectural Coatings Survey.

Response: Regarding the comments that there is no reasonably foreseeable technology that would achieve the proposed limits and that the limits might be appropriate for some applications and not others within a category, the commenter is referred to responses to comments #3-13 through #3-16. With regard to costs, this issue will be addressed in the economic impact assessment of the final Staff Report for the proposed SCM. Finally, concerning postponement of the proposed SCM, the public meeting for the ARB's consideration of the proposed SCM has been delayed from November 1999 to May 2000. This delay has provided additional time for ARB staff to meet with industry and consider their concerns with the proposed VOC limits.

3-26. Comment: The ARB should work with coatings manufacturers and users to identify those applications that cannot be technically or economically reformulated or replaced by a lower VOC product at the proposed limits. Expansion of the number of coatings categories in the SCM, as accomplished in the national AIM rule, would ensure that lower limits would not apply to those categories for which they are not feasible.

Response: The ARB staff has conducted extensive technology evaluations in more than 60 categories, and found compliant coatings that can meet the proposed VOC content limits for the coatings categories in the proposed SCM. Further, to date the staff has conducted four workshops, considered about 60 comment letters, and held about 25 meetings with individual stakeholders. We believe the proposed SCM reflects the results of these outreach efforts. Thus, the ARB staff believes that the further expansion of categories is unnecessary. The commenter is referred to Appendix E and the summary table in Chapter IV of the Draft Program EIR, the Staff Report, and the response to comment #3-17.

3-27. Comment: The air districts need to evaluate the use of alternative methods to determine the VOC content of low-VOC coatings and notes that Method 24 can give false readings for very-low-VOC (<75 g/l) coatings.

Response: Method 24 was extensively peer-reviewed by industry and government agencies, and is the test method is used to enforce local district rules in California, as well as the National Architectural Coatings Rule. The commenter is referred to the response to comment #1-4.

3-28. Comment: The Program EIR should explore an option to allow for the purchase of noncompliant coatings. Conceptually, a noncompliant coatings fee is essentially a “pay-to-pollute” proposal.

Response: The ARB has evaluated an exceedance fee option as a project alternative and has found this alternative to be infeasible. The commenter is referred to Chapter V of the Draft Program EIR.

3-29. Comment: The Program EIR should consider the human health impacts associated with the use of higher molecular weight polymers in low-VOC compliant coatings. For the proposed 50 g/l VOC limit in nonflats, more specialized coatings (*e.g.*, two-pack systems) will be used.

Response: Chapter IV of the Draft Program EIR evaluates the human health impacts associated with high molecular weight polymers. This analysis compares the carcinogenic, chronic, and acute human health impacts from the use of replacement solvents in low-VOC compliant coatings. The analysis found that for two-component IM coatings systems containing diisocyanates, significant human health impacts are not expected. The commenter is also referred to the response to comment #2-19.

In the context of the 50 g/l VOC limit for nonflats, the ARB staff has revised the SCM since the release of the NOP/IS to include only the interim limits, which will take effect in 2003 (2004 for IM coatings). The final limits have been dropped at this time due to an effort to focus staff resources on the technical, environmental, and economic issues associated with the interim limits. The commenter is referred to the response to comment #2-1.

3-30. Comment: The Program EIR must analyze solid waste/hazardous waste impacts associated with increased disposal of uncured two-component coatings systems.

Response: Chapter IV of the Draft Program EIR includes an analysis of potential impacts to landfills from the use of two-component coatings systems. The analysis concludes that, even taking into consideration as a “worst-case” the disposal of some coatings due to pot-life problems, implementation of the proposed SCM will not result in significant solid waste/hazardous waste impacts. The commenter is referred to the Solid Waste/Hazardous Waste Impacts section of Chapter IV in the Draft Program EIR.

3-31. Comment: The interim limits should not become effective until July 1, 2004, and the final limits, if shown to be technically feasible, should not become effective until July 1, 2008.

Response: Concerning the effective date of the interim VOC limits, the commenter is referred to responses to comments #3-2 and #3-3. Regarding the final VOC content limits, the ARB staff has revised the SCM since the release of the NOP/IS to include only the interim limits, which will currently take effect in 2003 (2004 for IM coatings). The final limits have been dropped at this time due to an effort to focus staff resources on the technical, environmental, and economic issues associated with the interim limits.

3-32. Comment: The interim limits should be the focal point of discussion and any final limits should be replaced by an increments of progress approach.

Response: Since the release of the NOP/IS, the ARB staff has revised the SCM to include only the interim limits. The commenter is referred to responses to comments #3-2, #3-3, and
#3-31.

3-33. Comment: The ARB should adopt the National AIM Rule as the template for the SCM. In the commenter's opinion, this approach would provide uniformity between the National Rule and the rules promulgated by individual air districts in California.

Response: The commenter is referred to the response to comment #3-17.

3-34. Comment: The SCM should consider further subdividing the following coating categories: IM, flats, nonflats, PSUs, stains, and waterproofing sealers.

Response: The ARB staff has created new categories as a result of our technology assessment. These categories include bituminous roof coatings, recycled coatings, antenna coatings, anti-fouling coatings, flow coatings, rust preventative coatings, specialty primers, clear brushing lacquers, temperature-indicator safety coatings, and floor coatings. However, the ARB staff does not concur with the commenter's recommendation to add subcategories for high gloss non-flat coatings, high gloss IM coatings, tank lining and pipe coatings, and semi-transparent stains. The ARB staff's research has found many low-VOC compliant coatings for each of the additional subcategories proposed by the commenter. The commenter is referred to Appendix D of the Draft Program EIR for a discussion of each coating category included in the SCM.

3-35. Comment: Changes to the following rule definitions are warranted: tank lining and pipe coatings, interior semi-transparent stains, and specialty primers.

Response: The commenter's proposed changes including definitions mentioned in comment #3-34 are discussed separately below.

Semi-Transparent Stains
The ARB staff has found interior and exterior semi-transparent stains that comply with the proposed 250 g/l limit. A detailed discussion of these coatings can be found in Appendix E of the Draft Program EIR. Appendix D of the Draft Program EIR contains a list of compliant semi-transparent stains.

High-Gloss Nonflats

The ARB staff has found high gloss coatings for both interior and exterior uses which meet the VOC limits proposed in the SCM. A detailed discussion of these coatings can be found in Appendix D of the Draft Program EIR. Appendix E of the Draft Program EIR contains a list of compliant products. The commenter is referred to the response to comment #2-12.

Tank Lining and Pipe Coatings

The ARB staff has found tank lining and pipe coatings that comply with the proposed IM VOC content limits. However, we are proposing to delay the effective date of the 250 g/l limit for IM coatings until January 1, 2004, to allow more time for essential public service agencies to complete administrative processes. This extension would avoid the need to provide essential public services a higher VOC limit until they receive approval to use complying coatings.

COMMENT LETTER #4
Painting and Decorating Contractors of America (PDCA)
June 29, 1999

4-1. Comment: The commenter is strongly opposed to the proposed SCM. ARB should establish a joint agency/industry working group, move the adoption date to June of 2000, assume a leadership role, and reestablish trust with industry.

Response: The ARB staff has been working closely with the SCAQMD's Architectural Coatings Working Group since 1998. We have also formed an industry/ARB/air district committee to work with us on developing an averaging provision. In addition, ARB staff has held four workshops with industry since June 1999 and, since then, has met with over 25 individual companies and associations, including the PDCA. We have postponed ARB's consideration of the SCM from November 1999 to May 2000.

4-2. Comment: The proposed SCM mirrors the SCAQMD's Rule 1113.

Response: The ARB staff is using the SCAQMD's Rule 1113 as a starting point, but our efforts have been concentrated on the interim limits contained in Rule 1113. We are conducting an independent analysis of the technical and commercial feasibility of the interim limits. We are not considering Rule 1113's final limits at this time.

4-3. Comment: ARB has an opportunity to establish a leadership role in the regulation of architectural coatings.

Response: We are taking a leadership role in developing the SCM with the districts. We will be doing so as we consider the development of a statewide averaging approach and in encouraging districts to adopt the SCM as approved by the Board.

COMMENT LETTER #5
Society of Specialty Protective Coatings (SSPC)
July 23, 1999

5-1. Comment: The technology for IM coatings to meet the <250 g/l interim limit is not proven for several types of exposures (*e.g.*, acids, bases, solvents, and oxidizers).

Response: The ARB staff has conducted a thorough technology assessment of coatings available today that would comply with the proposed 250 g/l limit. Based on our review, we have concluded that products that would comply with that limit are technologically and commercially available, and that such products perform as well as current high-VOC IM coatings. The complying products include coatings for immersion and non-immersion service involving exposure to various substances, including chemicals such as acids, bases, solvents, and oxidizers. Nevertheless, to allow time for essential public services agencies to complete administrative processes before low VOC coatings can be used, we have delayed the proposed effective date until January 1, 2004. This extension would avoid the need to provide essential public services a higher VOC limit until they receive approval to use complying coatings.

5-2. Comment: IM coating suppliers indicate that low-VOC polyurethanes are not available below 320 g/l.

Response: The ARB staff's technology assessment for IM coatings included an assessment of polyurethane coatings for severe exterior exposure. The assessment concluded that products that would comply with that limit are technologically and commercially available, and that such products perform as well as current high-VOC IM coatings. Polyurethane products that would comply with the proposed 250 g/l limit are generally water-based, rather than the current solvent-based polyurethanes with VOC content above 320 g/l. The commenter is also referred to the response to comment #5-1.

5-3. Comment: The 100 g/l final VOC content limit for IM coatings is unachievable based on today's coating technology.

Response: The ARB staff's investigation has found several low-VOC coating technologies that can meet the 100 g/l limit for IM coatings. However, the ARB staff has revised the SCM since the release of the NOP/IS to include only the interim limits (*e.g.*, 250 g/l for IM coatings), which will take effect in 2004. The final limits have been dropped at this time due to an effort to focus staff resources on the technical, environmental, and economic issues associated with the interim limits. The commenter is referred to the response to comment #2-1.

5-4. Comment: The metallic pigmented filled coatings definition should include zinc.

Response: We have revised the definition of metallic pigmented coatings accordingly.

COMMENT LETTER #6a
Law Offices of Smiland and Khachigian
June 25, 1999

6a-1. Comment: (1) the proposed SCM mirrors the SCAQMD's Rule 1113; (2) it is impossible to align the SCM with U.S. EPA's National AIM Rule; and (3) the ARB has not conducted a prior independent economic nor environmental review to support its conclusions.

Response: In many respects, the proposed SCM does mirror the SCAQMD's Rule 1113. The ARB staff's independent and comprehensive review of commercially available low-VOC compliant coatings technology reveals that SCAQMD's interim limits are technologically and economically feasible. The commenter is correct that the proposed SCM does not align exactly with U.S. EPA's National AIM Rule. However, the proposed SCM does incorporate many of its features. The commenter is referred to responses to comments #3-17 and #3-33.

Regarding the commenter's third assertion, it is not clear exactly what is implied by the statement "no prior independent economic nor environmental review to support those conclusions." If the commenter is alleging that the ARB staff is making final decisions about the proposed SCM without conducting economic or environmental analyses, the commenter is mistaken. One of the important aspects of this SCM effort is the consideration of the environmental and economic impacts of the proposed SCM. To that end, the Draft Program EIR comprehensively analyses the environmental impacts associated with implementation of the proposed SCM. The ARB staff will also conduct an in-depth analysis of the economic impacts of the SCM. This analysis should be completed at the same time as the final Program EIR and will be made available to the public at that time. The ARB's final decision on the proposed SCM will be based on comprehensive and in-depth environmental and economic analyses as well as comments submitted by industry and other interested parties.

If the commenter is implying that the ARB supported the SCAQMD's Rule 1113 without conducting these analyses, the ARB staff fails to see how that is relevant to this SCM. As part of this proposed SCM, ARB staff has conducted its own technical analysis of whether low-VOC compliant coatings are available to meet the proposed SCM VOC content limits. Based on its independent and comprehensive analysis, the ARB staff has found low-VOC compliant coatings that can meet the SCM limits. In addition, ARB staff has conducted an environmental analysis of using these low-VOC compliant coatings, and will soon complete its own economic analysis. Thus, the focus of this SCM process should be the merits of the ARB staff's findings from these analyses rather than the ARB's support of the SCAQMD's Rule 1113.

6a-2. Comment: As a result of U.S. EPA's promulgation of the National AIM Rule, the ARB is preempted from regulating architectural coatings.

Response: This comment does not raise any CEQA issues, and therefore no further response is required. Nevertheless, the ARB's Office of Legal Affairs has carefully reviewed this legal argument and concluded that it has no merit. The plain language of the Clean Air Act Amendments of 1990, as well as its legislative history, are quite clear that states are *not* preempted from establishing their own standards for consumer products and architectural coatings. This is true whether or not national rules are adopted by the U.S. EPA. The U.S. EPA agrees that states are not preempted by the Clean Air Act or by the U.S. EPA's adoption of a national rule, and has explicitly said so in the Federal Register notices for the national consumer products and architectural coatings rulemakings. Finally, in 1997 the commenter sued the ARB and the SCAQMD in federal District Court, and one of the causes of action in this lawsuit was the commenter's theory that states are preempted from regulating architectural coatings. In August 1997, District Court Judge Pregerson rejected this theory and ruled in favor of the ARB and the SCAQMD.

6a-3. Comment: If ARB continues to regulate architectural coatings, VOC content limits and compliance deadlines should be reasonable.

Response: See the response to comment #3-13.

6a-4. Comment: The ARB should avoid the catastrophic error made by the SCAQMD in banning virtually all paints. The ARB should exercise a leadership role to restore reason to the statewide clean air program.

Response: The ARB staff does not agree with the commenter's assertion that the SCAQMD's Rule 1113 bans virtually all paints. The ARB staff's independent analysis of commercially available low-VOC compliant coatings supports this conclusion. However, the SCAQMD's Rule 1113 is not at issue in the proposed SCM process. The focus should be on whether the ARB staff adequately evaluated the technical merits and environmental impacts of the proposed SCM.

6a-5. Comment: The ARB cannot proceed further without conducting the required environmental analysis under CEQA. The commenter also believes that the ARB's adoption of the SCM is a "regulation" under California law, and that that the ARB must follow the process specified in the California Administrative Procedure Act (APA), including the economic analysis requirements of the APA.

Response: The ARB staff agrees that the adoption of the SCM is a "project" subject to CEQA, which is why the ARB staff has prepared the draft Program EIR. The commenter is referred to this document for an analysis of the environmental impacts associated with the proposed SCM. It is not correct that the adoption of a nonbinding Suggested Control Measure is a regulation under the APA. On this legal theory the commenter has twice sued the ARB, with respect to the 1989 SCM adopted by the ARB. The Court of Appeal has twice rejected the commenter's arguments. Even though the APA does not apply and an economic analysis of the SCM is not legally required, the ARB staff believes that performing an economic analysis is good public policy. A thorough economic analysis of the SCM will be completed and released for public comment prior to the ARB's consideration of the SCM.

6a-6. Comment: The primary precursor of ozone is NO_x, emitted mainly by motor vehicles and industrial combustion sources, and references the National Research Council report, "Rethinking the Ozone Problem in Urban and Regional Air Pollution."

Response: The ARB staff does not concur with the commenter's statement. Scientific evidence supports the theory that VOCs play a significant role in the formation of ozone. In particular, ground level ozone formation is a result of complex chemical reactions involving both VOCs and NO_x. VOCs react with hydroxyl radicals to form organic peroxyl radicals which subsequently react with nitric oxide (NO) to form nitrogen dioxide (NO_2). Nitrogen dioxide photo-disassociates to form NO and oxygen atoms. The oxygen atoms rapidly associate with molecular oxygen to form ozone. The amount of ozone formed is a function of the number of conversions of NO to NO_2 due to the organic "chain reactions." When VOC emissions are lowered, the number of NO-to-NO_2 conversions decrease. Discussions of the atmospheric chemistry of ozone formation can be found in the 1991 National Research Council report, "Rethinking the Ozone Problem in Urban and Regional Air Pollution." Specifically, page 116 states... "the presence of VOCs causes enhanced NO-to-NO_2 conversion and hence the production of concentrations of ozone that exceed those encountered in the clean background troposphere."

Furthermore, the relative effectiveness of VOC and NO_x controls for reducing ozone in a particular area depends on the ambient VOC:NO_x ratio in that area. Historic ozone trends for California indicate that there is a correlation between a mass VOC reduction and ozone reduction. Therefore, further significant VOC reductions are needed from both mobile and stationary sources in order for many air basins to comply with the national and California ambient air quality standards for ozone. The need to regulate VOCs with respect to reducing ozone formation is discussed extensively in the More Reactivity section of Chapter IV of the Draft Program EIR. The commenter is also referred to the response to comment #1-1.

6a-7. Comment: Organic compounds play a role in ozone nonattainment in some areas at some times. For an organic compound to be an ozone precursor, it must be sufficiently volatile and reactive to chemically react with NOx in the atmosphere.

Response: The commenter is referred to a detailed discussion of reactivity and LVP-VOCs in Chapters IV and V of the Draft Program EIR and the response to comment #1-1.

6a-8. Comment: The predominant organic compounds in water-borne coatings are a class of resins and additives (cosolvents) which include ethylene glycol and propylene glycol. Glycol compounds are exempted from the ARB's and U.S. EPA's consumer products regulations.

<u>Response</u>: The ARB staff considered a low-volatility (LVP-VOC) alternative for the proposed SCM. In Chapter V of the Draft Program EIR, the ARB staff extensively discussed the issues raised by the commenter, and concluded that it would not be appropriate to include an LVP-VOC exemption in the SCM. The commenter is referred to this discussion for a detailed response to this comment.

Although the ARB's and the U.S. EPA's consumer product regulations contain an exemption for low volatility compounds, there is no similar exemption in district architectural coating rules or for ARB's aerosol paint regulation. The ARB staff believes that the low volatility compounds mentioned by the commenter eventually are emitted completely from paints. Finally, Method 24 does not count as VOCs those VOCs that do not evaporate and remain in the film.

6a-9. <u>Comment</u>: The predominant organic compounds in solvent-borne coatings are a class of petroleum distillate carriers (mineral spirits), which are low in reactivity and do not contribute significantly to ozone formation.

<u>Response:</u> The commenter is referred to the More Reactivity section in Chapter IV of the draft Program EIR. The ARB staff disagrees with this comment. Existing data suggest that hydrocarbon solvents are reactive and are likely to form ozone once emitted. Using the U.S. EPA's approach of using the reactivity of ethane as being non-reactive, mineral spirits are at least 3 to 4 times more reactive than ethane. Mineral spirits that contain aromatics could be as much as 8 to 9 times more reactive than ethane.

6a-10. <u>Comment</u>: The U.S. EPA, ARB, and SCAQMD have never shown that the organic compounds in paints contribute materially or at all to ozone nonattainment, and notes that the U.S. EPA estimates that organic compound emissions from architectural coatings constitute about one percent of such emissions from all sources.

<u>Response</u>: The ARB staff disagrees with the commenter's statement concerning the contribution of architectural coatings VOCs to ozone levels. Historical ozone data as well as air quality modeling conducted by air districts in their Air Quality Management Plans reveals that ambient ozone concentrations have been reduced over time by a combination of VOC and NO_x reductions. Thus, a concerted effort in reducing both NO_x and VOC emissions from both mobile and stationary sources is required if ozone nonattainment areas are to meet the federal and state ambient ozone standards.
In ARB's published 1996 emission inventory, architectural coatings are estimated to contribute statewide 130 tons per day of reactive organic gases (ROG), out of a total of 3,200 tons per day of ROG from all sources, and 1,470 tons per day of ROG for stationary sources. Thus, emissions of architectural coatings contribute about nine percent of stationary/area sources and four percent of total emissions statewide. A recent source apportionment study shows that surface coatings were a major contributor to ambient non-methane hydrocarbon in the South Coast Air Basin. Although the source apportionment study measured only emissions from solvent-borne coatings, one can extrapolate to the emissions of all coatings, and the percentage of the architectural coatings inventory in the source apportionment can be estimated to be four percent, the

same number as the ARB reports in its emission inventory. This subject is discussed in more detail in Chapter II of the Draft Program EIR.

6a-11. Comment: For 22 years, without scientific evidence, U.S. EPA, ARB, and the SCAQMD have waged war against the paint industry in the name of clean air.

Response: The ARB staff disagrees with the commenter's characterization of its indirect efforts to regulate VOC emissions from architectural coatings in the past. The ARB, the SCAQMD, and the U.S. EPA have never had a policy of "waging war" against the paint industry. The past as well as the current proposed SCM has and is premised on the ARB staff's best and comprehensive efforts to provide a workable model rule to local air districts. These past and present SCM versions are based on technologically and economically feasible coatings technology. Throughout these SCM efforts, the ARB staff has complied with all legal requirements and has provided an open public forum for affected industry to provide both oral and written comments. Furthermore, ARB staff has met and is willing to meet individually with industry representatives to discuss their particular concerns. This open and fair SCM process is far from the adversarial picture painted by the commenter.

6a-12. Comment: The commenter provides a history of paint regulation by the ARB.

Response: The commenter's recitation of the historical regulation of architectural coatings by the ARB is noted.

6a-13. Comment: State Implementation Plans (SIPs) containing architectural coatings rules have typically been approved and transmitted to the U.S. EPA by the staff, not the Board.

Response: The commenter is correct that, after public hearings have been conducted by the local air districts, SIPs are commonly approved and transmitted to the U.S. EPA by the ARB's Executive Officer. This is a well-accepted practice that the ARB has used for many years. The practice is authorized by Health and Safety Code sections 39515, 39516, and 39602.

6a-14. Comment: When the ARB attempts to ban coatings, industry and air districts rebel.

Response: The ARB staff is not quite sure what the commenter means by "rebelling." In fact, the position paper of the California Air Pollution Control Officers Association supports a strong SCM. In any event, the ARB staff disagrees with the commenter that the proposed SCM will result in a "ban" of coatings. The commenter presumes, incorrectly, that currently compliant products will be banned. See the response to comment #3-13.

6a-15. Comment: The commenter provides a history of U.S. EPA's regulation of paint.

Response: The commenter's recitation of the historical regulation of architectural coatings by the U.S. EPA is noted.

6a-16. Comment: If the federal Clean Air Act (CAA) were treated as a federal mandate "commandeering" local and state regulators, it would violate the Tenth Amendment of the U.S. Constitution.

Response: It appears that the commenter is suggesting that no governmental entity in the United States may regulate architectural coatings because the federal CAA is invalid under the Tenth Amendment of the U.S. Constitution. ARB's counsel has carefully reviewed this legal argument and has found that it has no merit. In 1997 the commenter sued the ARB, the U.S. EPA, and the SCAQMD in federal District Court. One of the causes of action in this lawsuit was the commenter's Tenth Amendment theory. In August 1997, District Court Judge Pregerson rejected this theory and ruled in favor of the ARB, the U.S. EPA, and the SCAQMD.

6a-17. Comment: The theory behind U.S. EPA's National AIM Rule was to reduce VOC emissions through reformulation, not by banning coatings.

Response: The ARB staff agrees with the commenter's portrayal of U.S. EPA's intent behind the National AIM Rule. The ARB staff believes its proposed SCM is consistent with this intent. The ARB staff, through its own independent and comprehensive investigation, has found commercially available low-VOC compliant coatings with comparable performance to conventional coatings (see Appendix E and Table IV-2 in Chapter IV of the Draft Program EIR). Thus, the proposed SCM VOC content limits will not result in the ban of coatings since compliant coatings are available. If anything, the proposed SCM will cause reformulation of some coatings, but not the ban of existing products.

6a-18. Comment: The SCAQMD acted reasonably for 22 years in regulating paints.

Response: The ARB staff concurs with this statement and further believes the SCAQMD as well as other air districts currently act reasonably and in compliance with their statutory mandates in regulating architectural coatings.

6a-19. Comment: The SCAQMD has "gone off the deep end" with its 1996 and 1999 amendments to its Rule 1113.

Response: The ARB staff disagrees with the commenter's assertion that the SCAQMD's Rule 1113 has "gone off the deep end." The ARB staff's independent analysis of commercially available low-VOC compliant coatings supports the SCAQMD's conclusions. However, as mentioned previously, the SCAQMD's Rule 1113 is not at issue in this SCM process. This SCM's focus should be on whether the ARB staff adequately evaluated the technical merits and environmental impacts of the proposed SCM.

6a-20. Comment: The SCAQMD's coatings bans cannot be excused on the basis that they are technology forcing.

Response: The commenter is referred to responses to comments #6a-14, #6a-17, and #6a-19.

6a-21. Comment: The commenter, after attacking the SCAQMD's 1996 and 1999 amendments to Rule 1113, indicates that this comment letter is not the time or place to detail the SCAQMD's recent sorry performance.

Response: The ARB staff agrees that the commenter should focus on the ARB's proposed SCM and not the SCAQMD's Rule 1113. The commenter is referred to the response to comment #6a-19.

6a-22. Comment: The commenter mentions that the SCAQMD's draconian actions were taken without widespread public support and in the face of controversy, and cites newspaper articles and the stance of one SCAQMD Board Member who voted against the 1996 and 1999 amendments to Rule 1113.

Response: It is irrelevant whether the SCAQMD's amendments were widely supported by the public, and industry does not determine whether the rule amendments are valid. The determining factor in determining the validity of the rule is whether the amendments were made in compliance with the various statutory mandates, and are based on feasible technology. Based on ARB staff's independent analysis of the coatings technology commercially available, which also forms the basis of the proposed SCM, it appears that the SCAQMD's amendments meet these criteria. However, the focus of this SCM process should not be on the SCAQMD's Rule 1113, but the proposed SCM. The commenter is referred to the response to comment #6a-19.

6a-23. Comment: The ARB has now stepped into the same untenable position as the SCAQMD by proposing the SCM for architectural coatings.

Response: The ARB staff disagrees with the commenter's accusation that it is stepping into an untenable position by proposing the SCM and its VOC content limits. The ARB staff's independent investigation has found several low-VOC coating technologies that can meet the proposed limits. However, since the release of the NOP/IS, the ARB staff has revised the SCM to only include the interim limits, which will take effect in 2003 (2004 for IM coatings). The final limits have been dropped at this time due to resource constraints; deferring consideration of the final limits will allow ARB staff to focus on the interim limits. Thus, the ARB staff believes that the proposed SCM is being undertaken in a fair and open process that allows for industry and the public to voice their concerns. The commenter is referred to the response to comment #2-1.

6a-24. Comment: For 22 years, the U.S. EPA, the ARB, and the SCAQMD have "triple-teamed" industry with coatings regulations. The commenter argues that there is a need for one regulatory entity and the ARB should gracefully retire from the field. The U.S.EPA is the only agency with explicit rulemaking authority over architectural coatings.

Response: The ARB staff does not agree that only the U.S. EPA should regulate architectural coatings. Because of California's serious air quality problems, in many areas of the state it is necessary to have very strict air quality standards. It is therefore common for districts to have more stringent standards than the national standards for many source categories. What the commenter refers to as "triple-teaming" is simply the way that California has regulated air quality for many years in order to deal effectively with very serious air quality problems.

6a-25. Comment: The ARB does have oversight authority of air district rules, may provide assistance to any district, and has the responsibility to conduct research into the causes and effects of air pollution.

Response: The ARB staff acknowledges this comment.

6a-26. Comment: After 22 years in the paint field, it is doubtful whether districts any longer need the ARB's assistance, and whether there is any longer a need for the ARB to exercise its oversight powers by adopting a model rule. ARB should limit its actions to coordinating district efforts to harmonize California rules with the National AIM Rule, and conduct research on the volatility of glycols and the reactivity of mineral spirits.

Response: When the ARB adopts an SCM, such as this SCM for architectural coatings, the ARB is *not* exercising its oversight powers, as that term is commonly understood. The ARB would be exercising its oversight powers only if the ARB proposed to actually take over the powers of a district, held a public hearing within the district, and adopted the SCM as a district rule in order to impose binding regulatory requirements on industry and the public. The ARB is not doing this, but is instead considering the approval of the SCM as a nonbinding model rule that districts can then adopt if they choose to do so. Binding requirements would only be imposed if the SCM is subsequently adopted by a district. The ARB believes that developing the SCM is very useful for the districts, many of which do not have the resources to do the technical work themselves. The SCM has been harmonized with the national AIM rule to the extent that this is appropriate, in light of California's serious air quality problems and the long history of prior district regulation of this source category. The ARB will also continue to conduct research on reactivity and other areas related to architectural coatings.

6a-27. Comment: Because U.S. EPA has now adopted nationwide limits, state law prohibits inconsistent ARB standard setting.

Response: As explained in detail in the response to comment #6a-2, the ARB is convinced that the federal Clean Air Act does not preempt California from setting its own architectural coatings standards. The commenter's belief that state law somehow prohibits different standards from being set is equally incorrect, and is contradicted by the entire framework of air quality regulation established in Division 26 of the Health and Safety Code.

6a-28. Comment: The proposal and any adoption of the SCM are subject to the Administrative Procedure Act (APA).

Response: As explained in more detail in the response to comment #6a-5, the APA does not apply to the adoption of the SCM by the ARB.

6a-29. Comment: The ARB is preempted from regulating architectural coatings by U.S. EPA's National AIM Rule.

Response: As explained in more detail in the response to comment #6a-2, U.S. EPA's promulgation of the National AIM rule does not preempt California (or any other state) from adopting different architectural coatings rules.

6a-30. Comment: If the ARB stays in the paint game, it should adopt limits that are reasonable.

Response: The ARB staff's proposed limits are reasonable. The commenter is referred to responses to comments #6a-4, #6a-14, and #6a-17.

6a-31. Comment: Paint bans have massive economic costs and produce adverse environmental impacts.

Response: Regarding paint bans, the commenter is referred to responses to comments #6a-4, #6a-14, and #6a-17. Regarding the environmental impacts associated with implementation of the proposed SCM, the commenter is referred to the Draft Program EIR. In the context of economic costs associated with implementation of the proposed SCM, the commenter is referred to the Economic Analysis that will be included in the Staff Report for the Architectural Coatings SCM.

6a-32. Comment: Most air districts that have regulated paints have imposed limits that require reformulation, not the banning, of paints. The ARB's 1989 SCM, which attempted to outlaw certain solvent-borne coatings, has had no real effect in most areas.

Response: The commenter is referred to responses to comments #6a-4, #6a-14, and #6a-17.

6a-33. Comment: The U.S. EPA's National AIM Rule requires reformulation, not the banning, of paints.

Response: The commenter is referred to the response to comment #6a-17.

6a-34. Comment: The ARB should harmonize the SCM with U.S. EPA's National AIM Rule.

Response: The commenter is referred to the response to comment #3-17.

6a-35. Comment: If regulators continue to follow the regulatory course that the SCAQMD has undertaken, as evidenced by its recent amendments to Rule 1113, they can expect to find industry seeking monetary damages in lawsuits, lobbying the state Legislature and Congress to overturn the regulators' authority, and using the press to undermine the public's confidence.

<u>Response</u>: If the commenter believes that these actions are the best way to deal with regulators, the commenter must ultimately do what it feels best to protect its interests. However, the ARB staff believes that this SCM process is open and fair and affords the commenter and others every opportunity to express their concerns and objections to the proposed SCM. ARB staff would be happy to meet individually with the commenter to discuss the commenter's specific concerns.

6a-36. <u>Comment</u>: Before taking any form of quasi-legislative action, the ARB must first analyze the environmental and economic effects of the major alternative approaches.

<u>Response</u>: The ARB staff is fully aware of its legal obligations in proposing this SCM. The ARB staff has prepared a comprehensive Program EIR and, although not legally required, will prepare an in-depth economic analysis. The commenter is referred to the Draft Program EIR for an analysis of the environmental impacts associated with the proposed SCM. The commenter is also referred to Appendix D of the Draft Program EIR for the technical justification for the proposed VOC limits in the SCM.

6a-37. <u>Comment</u>: The ARB is bound to follow the CEQA guidelines and CEQA case law when analyzing the environmental impacts of the proposed SCM.

<u>Response</u>: The ARB staff is fully aware of the CEQA requirements for preparing an environmental impact report and analyzing the environmental impacts associated with the proposed SCM. The ARB has met and exceeded all CEQA requirements in the preparation of the Draft Program EIR.

6a-38. <u>Comment</u>: Prior to offering comments on the SCAQMD's Rule 1113 amendments and circulating the proposed SCM, the ARB failed to prepare an EIR-equivalent analyzing the following environmental impacts of the proposed SCM: (1) aesthetic impacts of the first and second set of limits; (2) health and safety impacts thereof; (3) increased volatility of emissions after the first set of limits; (4) increased reactivity thereafter; (5) increased emissions thereafter; (6) adverse ozone impacts of substitutes for paint products; and (7) alternatives.

<u>Response</u>: The ARB staff disagrees with the commenter's claims. CEQA does not require an agency to prepare "an EIR-equivalent" when expressing an opinion on another agency's project. The ARB staff has released preliminary versions of the SCM at the various public workshops for discussion purposes. However, the release of these versions does not require that "an EIR-equivalent" be prepared. The preparation of the appropriate CEQA document is required once the lead agency determines the scope of the project. The Draft Program EIR is based on the SCM version that the ARB staff has determined is the project and comprehensively analyzes the environmental impacts associated with the proposed SCM. Aesthetic impacts are addressed in the

Environmental Impacts Found Not to Be Significant section in Chapter IV of the Draft Program EIR. Health and safety impacts are discussed in detail in the Human Health and Hazards sections, respectively, in Chapter IV of the Draft Program EIR. Volatility impacts are addressed in the Low Vapor Pressure section of Chapter V in the Draft Program EIR. Potential reactivity impacts are specifically addressed in the More Reactivity section of Chapter IV of the Draft Program EIR. This topic is also extensively addressed in response to comment #1-1. In addition, the reasons for rejecting a reactivity-based alternative are addressed in Chapter V of the Draft Program EIR. The industry issues regarding potential increases in VOC emissions from the proposed SCM are addressed in the following subsections of the Air Quality section of Chapter IV: More Thickness, Illegal Thinning, More Priming, More Topcoats, More Touch-ups and Repair Work, More Frequent Recoating, and Substitution. Lastly, project alternatives are addressed at length in Chapter V of the Draft Program EIR.

Furthermore, since the release of the NOP/IS, the ARB staff has dropped the final VOC limits to allow ARB staff to focus on the interim limits. The commenter is referred to the response to comment #2-1.

6a-39. Comment: The NOP/IS appears not to have addressed aesthetic impacts, health and safety impacts, and adverse ozone impacts due to substitutes, nor certain alternatives, including manufacturer disclosures.

Response: The NOP/IS is a brief notice sent by the lead agency to notify responsible agencies, trustee agencies, involved federal agencies, and other interested parties that the lead agency plans to prepare an EIR for a project with potentially significant impacts (CEQA Guidelines §15082). The purpose of the NOP/IS is to solicit guidance from those agencies or parties as to the scope and content of the environmental information to be included in the EIR. At this early stage of project development, the NOP/IS is not intended to evaluate the environmental impacts of the project. Thus, the NOP/IS for the proposed SCM was only intended to notify certain government agencies as well as other affected parties of the fact that ARB was undertaking this project and ARB's initial impressions of what potential significant impacts may result from the proposed SCM. As to the analysis of the potential impacts associated with the proposed SCM, the commenter is referred to the Draft Program EIR, which analyzes in detail the aesthetic impacts, health and safety impacts, ozone impacts due to substitutes, and alternatives. The commenter is also referred to the response to comment #6a-38.

6a-40. Comment: The commenter describes certain rulemaking requirements of the Administrative Procedure Act (APA), namely the requirement to assess whether a proposal will affect the elimination of existing businesses or jobs within California, and to assess the potential for adverse economic impacts on California business enterprises and individuals.

Response: As explained in more detail in the response to comment #6a-5, APA requirements do not apply to the adoption of the SCM by the ARB, since the SCM is not a "regulation" within the meaning of the APA.

6a-41. Comment: The ARB has proposed a draconian regulation without conducting the legally mandated economic analysis.

Response: As explained in more detail in the response to comment #6a-5, APA requirements (including the APA requirements to prepare an economic analysis) do not apply to the adoption of the SCM by the ARB. However, the ARB staff plans to conduct an economic analysis even though it is not legally required, because staff believes that it is good public policy to do so.

6a-42. Comment: The ARB has aided and abetted the blunder that the SCAQMD made in its 1999 amendments to Rule 1113.

Response: The ARB staff disagrees with the commenter's allegations. The commenter is referred to responses to comments #6a-1, #6a-4, #6a-14, #6a-17, #6a-19, #6a-21, #6a-22, #6a-23, #6a-24, and #6a-25.

6a-43. Comment: The ARB should get out of the business of regulating the paint industry and leave it to U.S. EPA. If it stays in the game, ARB should harmonize its SCM with U.S. EPA's National AIM Rule, most district rules, and its own 1981 and 1984 actions. ARB must not take any further action until it conducts its own environmental review under CEQA and its own economic review under the Administrative Procedures Act.

Response: Regarding the harmonization of the SCM with the U.S. EPA's National AIM Rule, the commenter is referred to responses to comments #6a-1, #6a-2, #6a-17, #6a-25 - #6a-30, and #6a-34.

Regarding the comment that the ARB conduct the appropriate environmental and economic analysis, the commenter is referred to responses to comments #6a-5, #6a-36, #6a-37, #6a-38, #6a-40, and #6a-41.

COMMENT LETTER #6b
Law Offices of Smiland and Khachigian
August 17, 1999

6b-1. Comment: The commenter requests a complete bibliography of any studies, articles, reports, or other documents to support the statement in the NOP/IS that ambient VOC concentrations cause coughing, sneezing, headaches, etc.

Response: The statement in the NOP/IS is from Davis, R. K., L. V. Urban, and G. S. Stacy, 1977. Environmental Impact Analysis: A New Decision in Decision Making. Van Nostrand Reinhold Co, New York, New York. The ARB staff notes that the term “VOC” is a generic one that includes many different compounds such as benzene, toluene, and xylenes. Many solvents used in architectural coatings formulations are VOCs. The health effects mentioned in the NOP/IS are caused by an individual’s exposure to one or more individual VOCs in the ambient air. There are numerous studies documenting the acute, chronic, and carcinogenic health effects of various VOCs, more than are possible to list here. However, for examples of studies of health effects of VOC solvents found in architectural coatings, the commenter is referred to the following studies:

Baker, E.L., R.E. Letz, E.A. Eisen, L.J. Pothier, D.L. Plantamura, M. Larson, and R.Wolford. Neurobehavioral Effects of Solvents in Construction Workers. *Journal of Occupational Medicine* 30(2):116-123, 1988.

Bolla, K.I., B.S. Schwartz, W. Stewart, J. Rignani, J. Agnew, and D.P. Ford. Comparison of Neurobehavioral Function in Workers Exposed to a Mixture of Organic and Inorganic Lead and in Workers Exposed to Solvents. *American Journal of Industrial Medicine* 27:231-246, 1995.

Mikkelsen, S. Epidemiological Update on Solvent Neurotoxicity. *Environmental Research* 73:101-112, 1997.

Olson, B.A. Effects of Organic Solvents on Behavioral Performance of Workers in the Paint Industry. *Neurobehavioral Toxicology and Teratology* 4(6):703-708, 1982.

6b-2. Comment: The commenter supports consideration of the seven project alternatives listed in the NOP/IS, especially the low vapor pressure and reactivity alternatives.

Response: The Draft Program EIR comprehensively analyzes all project alternatives in Chapter V. The commenter is also referred to the response to comment #1-9.

6b-3. Comment: The ARB must analyze the non-renewable resources impacts resulting from the use of non-paint alternatives such as vinyl or aluminum siding or interior wall coverings, in lieu of unsatisfactory paints.

Response: Based on the ARB staff's analysis and the NTS study, implementation of the proposed SCM is not expected to result in substitution of low-VOC coatings with non-paint alternatives. Commercially available coatings that meet the proposed SCM VOC content limits perform comparably to conventional coatings in a variety of applications (see Appendix D, Appendix E and Table IV-2 in Chapter IV of the Program EIR). It is highly speculative that users will abandon paints altogether for non-paint substitutes when compliant performing coatings are available. Further, the commenter provides no evidence that this scenario will actually occur. Therefore, ARB staff does not anticipate significant non-renewable resources impacts from the proposed SCM. The commenter is referred to the Environmental Impacts Found Not To Be Significant section of Chapter IV.

6b-4. Comment: The Draft Program EIR must analyze aesthetics impacts resulting from the ban of over 90 percent of all architectural coatings.

Response: ARB staff does not agree that implementation of the SCM will result in a ban of paints (the commenter is referred to the responses to comments #6a-4, #6a-14, and #6a-17). Based upon information gathered by ARB staff on currently available compliant products, which have performance characteristics comparable to conventional coatings, significant aesthetic impacts are not expected. The commenter is referred to Appendix E and the related summary tables in Chapter IV of the Program EIR. The commenter is also referred to the Environmental Impacts Found Not to Be Significant section in Chapter IV of the Draft Program EIR.

6b-5. Comment: The NOP/IS fails to adequately address the potential health and safety impacts of the project as well as increased reactivity, increased volatility, and increased emissions, and that the Draft Program EIR must address substantially more impacts than those identified in the NOP/IS.

Response: The ARB staff believes that the Draft Program EIR, pursuant to CEQA, comprehensively analyzes all of the potential impacts mentioned by the commenter. See the response to comment #6a-38.

COMMENT LETTER #7
Textured Coatings of America (TCA)
June 24, 1999

7-1. <u>Comment</u>: ARB should establish specialty coatings categories for concrete protective, anti-graffiti, specialty primer, and mastic textured coatings at the recommended VOC limits of 400, 600, 350, and 300 g/l, respectively. For each category, the commenter provides technical justification for the coating and why lower VOC coatings are not an adequate substitute; the additional VOC emissions that would be associated with the coatings at the recommended VOC levels; and why the averaging provisions cannot be effectively used to keep these coatings in the market.

<u>Response</u>: The commenter is referred to the response to comment #7-2 for concrete protective coatings. For anti-graffiti coatings, our analysis did not identify a need for a separate anti-graffiti limit. We are aware of both permanent and sacrificial anti-graffiti coatings that meet proposed SCM limits for IM coatings. In fact, some anti-graffiti coatings are well below the proposed limits for flat and non-flat coatings, and some are zero or near-zero VOC. The sales weighted average VOC for anti-graffiti coatings in ARB's 1998 architectural coatings survey is 225 g/l, and the sales weighted average VOC for water based anti-graffiti coatings is 92 g/l. For specialty primers, we have added a new category with a limit of 350 g/l. For mastic textured coatings, the VOC limit in the SCM has been revised to be 300 g/l. The commenter is referred to the response to comment #1-10 and #2-6 for the averaging provision comment.

7-2. <u>Comment</u>: Concrete Protective Coatings – a VOC content of 400 g/l is required to achieve the desired performance and application characteristics. Low-VOC coatings cannot penetrate form oils and release agent materials used in the forming of the concrete and thus do not have good adhesion.

<u>Response</u>: The commenter is referred to a discussion of this category in Appendix E of the Draft Program EIR. Staff is aware of numerous waterproofing sealer products that meet the proposed VOC limit of 250 g/l. In addition, we believe the lower VOC products will adhere well with proper surface preparation. As with all coatings, the surface needs to be properly prepared prior to application of a coating for optimal performance. Thus, ARB does not believe it is necessary to have a separate category for these coatings.

7-3. <u>Comment</u>: With the increased use of tilt-up concrete (pre-formed concrete that is delivered to a building site and "tilted up"), VOC emissions will increase due to frequent repainting.

<u>Response</u>: Concrete should be allowed to cure for 30 to 60 days before coating, and the moisture content should be no higher than 15 percent to ensure success. Moisture is a common cause of coatings failing to properly adhere on concrete. If moisture can penetrate cured concrete it will leach out alkaline salts that can react with the resin in many coatings causing early adhesion failure. A test for moisture migration should be conducted if a moisture condition is suspected.

Release compound is formulated to weather off within a relatively short time, and should decompose by the time the concrete has cured to the correct moisture content. It is only necessary to brush off the decomposed release compound before coating. Release compound not decomposed by weathering must be removed before coating for proper adhesion. Water or abrasive blasting will effectively remove release compound.

A review of product data sheets indicates there are products for the specific applications indicated by the commenter that comply with the proposed standard. For all but one product, use instructions direct the applicator to allow the concrete to fully cure, as specified above.

7-4. Comment: Because the company is a manufacturer of specialty coatings, it cannot use the averaging provision. A company needs diverse product lines to use an averaging provision.

Response: Participation in the averaging program would be optional if such a provision is included in the final SCM. We have noted the commenter's concern and may be able to address it if an averaging program is developed. For example, a trading provision would allow such manufacturers to purchase credits from manufacturers with broader product lines. We encourage the commenter to participate in the development of the provision.

7-5. Comment: The commenter claims that its anti-graffiti coatings at a VOC content limit of 600 g/l provide the only effective protection for surfaces that cannot be recoated (*e.g.*, murals).

Response: The ARB staff has found permanent anti-graffiti systems that comply with the proposed SCM VOC content limits. The commenter is referred to the responses to comments #3-10 and #7-1.

7-6. Comment: The commenter asserts that the use of its anti-graffiti coatings will reduce VOC emissions associated with frequent repainting as compared to other systems with VOC content limits below 600 g/l. An exemption should be granted because the 1998 CARB survey shows that the usage associated with anti-graffiti coatings is so small.

Response: We agree that anti-graffiti products are a relatively small source of VOC emissions compared to other categories of architectural coatings and that anti-graffiti paints can prevent the emissions associated with repainting to cover graffiti. However, numerous low-VOC anti-graffiti products are available that provide the same benefits as higher VOC anti-graffiti products. As in the responses to comment # 7-1 and # 7-5, numerous manufacturers produce both sacrificial and permanent anti-graffiti coatings that comply with the limits for flat and non-flat coatings in the SCM. Many of those products are zero-VOC or near zero-VOC products.

7-7. Comment: Because the company is a manufacturer of specialty coatings, it cannot use the averaging provision. A company needs diverse product lines to use an averaging provision.

Response: The commenter is referred to the response to comment # 7-4.

7-8. Comment: Specialty Primers – lower VOC products cannot penetrate form oils on tilt ups.
Response: The commenter is referred to the response to comment # 7-2.

7-9. Comment: Because the company is a manufacturer of specialty coatings, it cannot use the averaging provision. A company needs diverse product lines to use an averaging provision.

Response: The commenter is referred to the response to comment # 7-4.

7-10. Comment: Mastic Textured Coatings – a solvent film will stay wet longer than a latex mastic and will accept coating application for uniformity. VOC emissions will increase from frequent repainting associated with the use of low-VOC compliant mastics.

Response: The proposed VOC limit for this category has been revised to 300 g/l, the level suggested by the commenter. This is the level most commonly found in California district architectural coatings rules.

7-11. Comment: Because the company is a manufacturer of specialty coatings, it cannot use the averaging provision. A company needs diverse product lines to use an averaging provision.

Response: The commenter is referred to the response to comment # 7-4.

7-12. Comment: If the proposed SCM limits go into effect, TCA will have to close down its Los Angeles factory and relocate it outside the state.

Response: We believe the limits proposed are technologically feasible. It is an individual manufacturer's decision to reformulate or exit the market. However, mastic texture coatings represent the bulk of product volume produced by TCA, and we have revised the VOC limit for that category back to 300 g/l, the most common limit currently in effect in California districts with architectural coatings rules. That is also the VOC limit for that category under the National Rule. Thus, the proposed SCM limits may not impact TCA.

COMMENT LETTER #8
Ameron International
July 20, 1999

8-1. Comment: There is a need for a chemical storage tank coating category in the proposed SCM.

Response: The commenter is referred to comment # 5-1.

8-2. Comment: There is a need for a nuclear coating category in the proposed SCM.

Response: Although the nuclear coatings category is not large, we do not believe a separate category with a higher VOC limit is necessary. We have identified several nuclear coatings for both concrete and steel that meet the 250 g/l VOC limit for IM coatings. ARB staff collected information on nuclear coatings in its 1998 architectural coatings survey and found that the sales weighted average VOC level for those coatings was 50 g/l.

8-3. Comment: The definition of tint base needs to be clarified.

Response: The definition has been revised in response to the comment.

8-4. Comment: The commenter cannot envision that technology will advance to the point to meet the 2006 IM limit.

Response: The limit initially proposed for 2006 is no longer being proposed at this time.

8-5. Comment: The commenter believes that in order to meet the 2002 IM limit, some provisions (*e.g.*, averaging and low volume usage) have to be made for low volume, non-compliant use products.

Response: The final SCM may include an averaging provision that will provide compliance flexibility while preserving emission reductions. To provide additional time for compliance, the proposed effective date for the IM limit has been extended to 2004.

8-6. Comment: Some consideration must be given to atmospheric conditions during the application of coatings. While the South Coast has a very moderate climate that lends itself to easier coatings applications, high temperatures, low temperatures, and high humidity environments can exist in the rest of California. The commenter believes that higher VOC limits are needed for applications under these extreme conditions, and suggests that 340 g/l may be appropriate.

Response: We have committed to evaluating the influence of climatic conditions on coating applications and have requested relevant information from coating manufacturers. To date, we have received very little information upon which to base such an evaluation.

However, based upon the information received to date, the proposed VOC limits are technically feasible under varying climatic conditions.

COMMENT LETTER #9
Euclid Chemical Co.
July 9, 1999

9-1. Comment: There is a need for a separate category regarding curing and sealing compounds at 700 g/l.

Response: The commenter is referred to a discussion of this category in Appendix E of the Draft Program EIR. There are a number of formulation technologies available that can meet the 350 g/l concrete curing compound limit while providing the needed curing and sealing of the concrete. Thus, staff does not think this category with a 700 g/l limit is warranted.

COMMENT LETTER #10
The Valspar Corporation
July 22, 1999

10-1. Comment: The proposed limits will likely eliminate a number of important coatings, which will protect homes and commercial buildings throughout California.

Response: The 1998 ARB Architectural Coatings Survey showed large market shares of products in the flat and non-flat categories that would comply with the proposed limits. Our evaluation of product information showed that there is a wide variety of product types that would comply with the proposed limits with performance characteristics similar to higher VOC coatings.

10-2. Comment: The flat 2001 limit of 100 g/l may allow for the use of medium quality paints, but high-performing paints will not be available. Compliant flats will have repeated washing, application, and freeze-thaw problems. These problems are even more of a concern with compliant flats meeting the 50 g/l limit.

Response: Our survey of product information indicates that a variety of manufacturers have been able to use available technology to achieve desirable properties for flat coatings with VOC levels at or below 100 g/l. Our survey indicates that there are a number of existing interior and exterior coatings that meet the proposed limit that are marketed as premium quality coatings. Further, the product information indicates that there are complying coatings with excellent scrub resistance and durability. Also, there are complying coatings that allow for low temperature application and products with good freeze-thaw resistance. The 50 g/l limit is no longer being proposed at this time.

10-3. Comment: The 2002 and 2006 limits for nonflats have the same problems, especially with freeze-thaw, film building, and film durability.

Response: The limit initially proposed for 2002 is now proposed for 2003, and the 2006 limit is no longer being proposed at this time.

Our survey of product information sheets indicates that there are a number of complying interior and exterior low and medium gloss coatings that are identified by their manufacturers as premium quality coatings. Further, the product information indicates that there are complying coatings with excellent durability, washability, and abrasion resistance. Also, there are complying products that allow for low temperature application and products with very good block resistance. Available information also suggests that the 150 g/l limit allows for the formulation of non-flat coatings with sufficient freeze-thaw resistance. Our survey of product information indicates that a variety of manufacturers have been able to use available technology to achieve a balance in desirable properties for the low and medium gloss paints with VOC levels at or below 150 g/l. The proposed effective date of January 1, 2003, will allow sufficient time for formulation of high gloss products with VOC content of 150 g/l that are comparable to higher VOC products over a broad range of performance characteristics.

10-4. Comment: The ARB is encouraged to more thoroughly investigate the effects of VOC reduction for flats and nonflats.

Response: ARB staff performed an extensive technical evaluation on the feasibility of the proposed limits for flat and nonflat coatings as part of the development of the SCM.

10-5. Comment: The VOC limits for floor coatings at 100 g/l (2002) and 50 g/l (2006) are too low for acceptable floor paints.

Response: The SCM no longer proposes a 50 g/l limit. Results of the ARB Architectural Coatings Survey indicate that about 128 floor coating products would comply with the proposed 100 g/l limit; those products represent about 35 percent of the market. Although the highest performance for floor coatings is provided by two-component formulations (epoxies and urethanes), there are many single-component floor coatings available that comply with the proposed limit of 100 g/l.

10-6. Comment: The quick-dry enamel limit should be at least 400 g/l because waterborne enamels do not dry fast enough, are not high enough in gloss, and do not have block resistance.

Response: We were able to identify, through product information sheets published by coatings manufacturers, a number of coatings that appear to meet the gloss and dry time criteria of quick-dry enamels and have VOC levels at or below 250 g/l. One of those coatings was described as having very-good non-blocking characteristics, demonstrating that current technology provides the ability to include such characteristics in a coating formulation.

In addition, independent laboratory studies conducted by NTS and Harlan and Associates identified commercially-available coatings with VOC levels at or below 250 g/l that meet the gloss and dry time criteria of quick dry enamels. Results of laboratory tests of block resistance for those lower VOC coatings (giving the most weight to the recent NTS tests which better reflect current technology) indicate that some of the lower-VOC coatings tested performed as well or better than high-VOC coatings. Those results suggest that some manufacturers have been able to formulate and market high gloss, quick drying coatings with good block resistance that meet the proposed 250 g/l limit.

10-7. Comment: A separate specialty primer category should be established with a VOC limit of 400 g/l. Waterborne primers do not prevent water-soluble stains like wood tannins and smoke stains from bleeding through.

Response: A review of available product data sheets indicates there are water-based specialty primers below 350 g/l available that are recommended for use on water damaged substrates, and which make claims of preventing the recurrence of water soluble stains. Product data sheet review also indicates that solvent-based specialty primers are available with a VOC content of 350 g/l or less which make similar claims.

10-8. Comment: A separate category entitled masonry conditioners and sealers with a VOC limit of 550 g/l should be established. Waterborne primers do not penetrate chalky substrates.

Response: We have established a category for specialty primers, as discussed in response to comment #10-7. The specialty primer category, with a proposed VOC limit of 350 g/l, includes those products that are for use on excessively chalky substrates.

10-9. Comment: The proposed SCM limit for semi-transparent stains of 250 g/l is to low. Waterborne semi-transparent stains open the wood's grain and dries too fast.

Response: Until recently, waterborne stains were typically based on acrylic emulsions. Unfortunately, those formulations result in more grain raising and shorter open times than conventional solvent-borne alkyd and oil based systems. With new technology (*e.g.* alkyd/acrylic hybrid polymers, alkyd-modified acrylics, and modified acrylic/water dispersible drying oil formulations) excellent open times and virtually no grain raising are possible.

10-10. Comment: The proposed SCM limit for waterproofing wood sealers of 250 g/l is too low. Subsequent coats of waterborne sealers do not adhere well.

Response: The technology assessment performed by ARB staff was the basis for the proposed limit. Staff does not believe the limit is too low. The ARB survey results indicate the availability of 95 products, representing 13 percent of the market, which would comply with the proposed limit. Regarding the ability of second coats to adhere well, this can be said of many coating formulations regardless of the specific category. Many coating technologies have specific limitations on the "recoat window," the timeframe in which a second coat must be applied. For some waterborne wood sealers, the second coat must be applied "wet-on-wet." The waterproofing technology of certain products cause water to bead up and run off treated surfaces. As the treated surface ages, this characteristic will be lost, and subsequent coats of the same products are possible and should adhere well.

10-11. Comment: The ARB staff should research the technological possibilities of achieving the proposed limits while considering whether they are widely available for all applications.

Response: Such a technical evaluation was performed in the development of the SCM.

COMMENT LETTER #11
Sierra Performance Coatings
July 22, 1999

11-1. Comment: The proposed SCM limits for IM coatings of 250 g/l are too high and the compliance date of 2002 is too late. The technology exists today to meet this limit. The limit should be 100 g/l starting 01/01/01.

Response: The proposed limit and timeframe for compliance were developed for a broad range of product types and applications. The commenter is also referred to the response to comments #5-1, #11-2, and #11-7.

11-2. Comment: The proposed limit fails to adopt "best available controls" pursuant to §183(e) of the CAA.

Response: Section 183 (e) of the Clean Air Act (CAA) requires the Administrator of the U.S. EPA to promulgate regulations requiring "best available controls," as defined in CAA section (e)(1)(A). This CAA provision applies only to the Administrator of the U.S. EPA. It does not apply to the ARB. However, the commenter may not be making a legal point; the basic thrust of this comment seems to be that the ARB could adopt more stringent VOC limits for certain product categories. Response # 2-1 explains why the ARB has chosen to address only the interim limits at this time and to postpone consideration of the final limits until after completion of this project.

11-3. Comment: The SCAQMD's Phase II Assessment of the NTS study indicates that low-VOC products generally perform just as well as high VOC products.

Response: The ARB staff's review of the NTS data shows that a number of low-VOC IM products have a number of performance characteristics that are comparable to those of higher-VOC coatings. ARB staff has proposed a VOC limit and compliance timeframe that considers the broad range of product types and applications in the IM category.

11-4. Comment: High performance, low-VOC paint products are commercially available, and there have been tremendous advances in raw materials technology over the last five years, so that low-VOC resins and curing agents are now common.

Response: The commenter is referred to the response to comment #11-3.

11-5. Comment: The widespread commercial availability of high-performance, low-VOC products demonstrates that a VOC content limit of 100 g/l is technologically and commercially feasible.

Response: The ARB staff agrees that high-performance, low-VOC products are commercially available. The commenter is referred to the response to comment #11-1 regarding the 100 g/l VOC limit.

11-6. Comment: The SCAQMD's Phase II Assessment of the NTS study indicates that zero-VOC products perform best overall.

Response: The commenter is referred to the response to comment #11-3.

11-7. Comment: The SCAQMD, in its 1999 amendments to Rule 1113, identified some 55 commercially available high-performance IM coatings at 100 g/l.

Response: The industrial maintenance coatings category covers a very broad range of coating uses and coating formulations. The proposed VOC limit of 250 g/l and the proposed effective date (revised to January 1, 2004) would provide more opportunity for a broader variety of coating formulations to be available in the future to meet those varied needs. For example, the current alkyd formulations are solvent-based in the vicinity of 400 g/l. We are aware of efforts to develop low-VOC alkyd formulations, including water-reducible alkyds. We believe that the proposal would allow resin and coating manufacturers to continue to develop different types of low-VOC coatings. This would ultimately provide more flexibility to industrial end-users to address specific coating needs in the future.

11-8. Comment: The commenter objects to an averaging provision, stating that it is a loophole with potential for circumvention of the standards.

Response: The averaging provision, if included in the final SCM, is an option available to manufacturers that would allow compliance flexibility without compromising the emission reductions that would have been achieved in the absence of averaging. The averaging provision would not provide a loophole because it would establish reporting requirements and a violation provision to ensure compliance. The commenter is referred to Chapter V of the Draft Program EIR.

11-9. Comment: VOCs are the main component in forming ground-level ozone. Additionally, the commenter notes the harmful health affects associated with exposure of individuals to unhealthful ozone levels.

Response: The ARB staff agrees that VOC emissions, along with NO_x emissions, are the main contributors to the formation of unhealthful ground-level ozone. The ARB staff also agrees that exposure to unhealthful ozone levels can cause a multitude of health problems. The commenter is referred to Chapter III of the Draft Program EIR as well as the response to comment #6b-1.

11-10. Comment: Studies have shown that painters exposed to solvents in paints can suffer a multitude of adverse health effects.

Response: The ARB staff is familiar with these studies and believes that they provide additional support for the need to reduce or replace more hazardous/toxic solvents in coatings with less hazardous/toxic solvents. Currently, it appears that reducing hazardous ingredients in paints is the trend among resin manufacturers and coatings formulators when reformulating higher-VOC coatings to low-VOC compliant coatings. The commenter is referred to the "Human Health" section of Chapter IV in the Draft Program EIR.

11-11. Comment: The proposed SCM fails to adopt the "best available controls" and is therefore inconsistent with ARB's duty under the federal Clean Air Act. The ARB should lower the VOC limit for IM coatings to 100 g/l and should implement the SCM before January 1, 2001.

Response: The commenter is referred to comment #11-1 and 11-2.

COMMENT LETTER #12
Flame Control Coatings, Inc.
July 12, 1999

12-1. Comment: The proposed VOC limits for fire retardant coatings are lower than the fire retardant coating industry can achieve at the present time. The limits should be 350 g/l for pigmented coatings and 650 g/l for clear coatings.

Response: In an earlier version of the SCM, we proposed lower VOC limits for fire-retardant coatings, based on survey information. We subsequently returned those limits to the existing limits in district rules (*i.e.*, 350 g/l for opaque coatings and 650 g/l for clear coatings) after further research into reformulation options.

12-2. Comment: The definition of fire retardant coatings should be clarified.

Response: Our investigation has verified the commenter's points and we have modified the definition accordingly.

12-3. Comment: Flame Control Coatings is a world leader in fire retardant paints, varnishes, and mastics.

Response: No response is necessary.

12-4. Comment: If the limits are not raised as requested, Flame Control Coatings will no longer be able to sell its products in California.

Response: The commenter is referred to the response to comment #12-1.

COMMENT LETTER #13a
Wm. Zinsser & Co., Inc.
July 21, 1999

13a-1. Comment: The commenter is opposed to the change in the definition of shellac to include natural resins. This will lead to confusion and create a loophole for manufacturers.

Response: We agree with the commenter and have, therefore, changed the shellac definition back to its previous wording. Shellacs shall include only those coatings that are solely formulated with the resinous secretions of the lac beetle (*Laccifer lacca*), which is how shellac has been defined for hundreds of years. The proposed definition is consistent with the 1989 SCM's shellac definition, and is the most common shellac definition found in the California districts' architectural coatings rules. Since the shellac category has been regulated for many years and the VOC limit is relatively high, it is important that we limit the definition so that the SCM's emission reductions are not compromised. Coatings containing other natural resins may continue to use the most applicable coating category, just as they have in the past. We believe that any substantial change to the definition will not only confuse consumers, but also may reduce the estimated emission reductions from the SCM.

COMMENT LETTER #13b
Wm. Zinsser & Co., Inc.
July 12, 1999

13b-1. Comment: The commenter is opposed to the change in the definition of shellac to include natural resins. This will lead to confusion and create a loophole for manufacturers.

Response: The commenter is referred to the response to comment #13a-1.

COMMENT LETTER #13c
Wm. Zinsser & Co., Inc.
July 9, 1999

13c-1. Comment: The commenter is opposed to the change in the definition of shellac to include natural resins. This will lead to confusion and create a loophole for manufacturers.

Response: The commenter is referred to the response to comment #13a-1.

COMMENT LETTER #14
Zehrung Brands
July 15, 1999

14-1. Comment: The commenter is opposed to the change in the definition of shellac to include natural resins. This will lead to confusion and create a loophole for manufacturers. Lower VOC coatings will be relabeled as shellacs to get higher VOC limit.

Response: The commenter is referred to comment #13a-1.

14-2. Comment: If the new shellac definition becomes law, 550 g/l VOC alcohol-based non-shellac primers will begin to displace the more commonly used solvent-based alkyd formulations.

Response: The commenter is referred to the response to comment #13a-1.

14-3. Comment: Solvent-based alkyd primers will be replaced because pure shellac formulations have unique characteristics and are expensive.

Response: The commenter is referred to the response to comment #13a-1.

14-4. Comment: The shellac definition should be restored.

Response: The commenter is referred to the response to comment #13a-1.

14-5. Comment: Non-shellac products could replace shellacs. Massive substitution could occur leading eventually to a lowering of the VOC for this category or elimination of the shellac category.

Response: The commenter is referred to the response to comment #13a-1.

14-6. Comment: Has the ARB explored the ramifications of mandating label wording, in this case requiring a category of products be labeled or identified as "shellac," when in fact the products do not have shellac in them?

Response: The commenter is referred to the response to comment #13a-1.

COMMENT LETTER #15
AKZO Nobel
June 25, 1999

15-1. Comment: For the definition of low solids coating, is the volatile component measured by weight or volume?

Response: The definition for that category has been revised. The definition no longer requires that at least half of the volatile component be water.

15-2. Comment: The ARB should include methyl acetate in the list of exempted low-reactive organic compounds.

Response: The list has been revised in response to the comment.

COMMENT LETTER #16
TruServ Manufacturing Co.
July 15, 1999

16-1. Comment: The proposed SCM VOC content limits are based on incomplete and inaccurate information. More consideration should be given to the rulemaking process before the SCM is adopted.

Response: The commenter is referred to the responses to comments #3-13 and #3-16.

16-2. Comment: Inaccuracies in the 1998 ARB survey must be reviewed and corrected before they are taken as fact.

Response: The survey has been very carefully reviewed for inaccuracies. The survey was finalized in September 1999 and made available to the public. The 1998 survey provides the most current and accurate information on architectural coatings in California. The survey was only one of many elements that we considered in our analysis of the feasibility of the proposed limits.

16-3. Comment: Most of the alternatives listed in the NOP/IS are unusable. In particular the commenter notes: (1) almost no manufacturers can use the averaging alternative; (2) the low vapor-pressure alternative would be of little benefit; and (3) the seasonal alternative would be a logistical nightmare.

Response: Each of the project alternatives mentioned in the NOP/IS, as well as additional alternatives suggested by industry during the development of the proposed SCM, are comprehensively analyzed in Chapter V of the Draft Program EIR.

16-4. Comment: Paint is used not only for decoration, but for protection of surfaces. The commenter also states that painting contractors have said at various workshops that coatings at current VOC limits exhibit only marginal performance. It is not known what further lowering of the VOC content will bring because there will not be enough time to reformulate and test reduced-VOC products.

Response: The ARB staff disagrees with the commenter’s assertion. According to the product data sheets analyzed by the ARB staff, many compliant low-VOC coatings perform comparably to conventional coatings in a variety of applications (see the tables in Appendix E and the related summary tables in Chapter IV of the Program EIR). In addition, the SCAQMD’s NTS study shows that overall, coatings that meet the SCM VOC content limits exhibit similar performance characteristics as conventional coatings.

16-5. Comment: According to the SCAQMD’s NTS study, compliant low-VOC nonflats are freeze-thaw unstable. This will lead to increased traffic impacts because out-of-state manufacturers would have to deliver products during the three high ozone seasons to avoid freezing en route.

Response: Significant adverse traffic impacts are not expected due to freeze-thaw problems. First, it is improbable that an additional 350 heavy-duty truck trips (deliveries) per day would occur at any one location as a result of restricting shipping to three seasons. Second, manufacturers of low-VOC resin technology indicate that the inclusion of surfactants will help eliminate freeze-thaw problems. The commenter is referred to the Transportation/ Circulation section of Chapter IV in the Draft Program EIR.

16-6. Comment: The ARB should consider: (1) adding more subcategories to nonflats; (2) extending the 2002 limits to 2004; (3) dropping the 2006 limits and revisiting them at a later date; and (4) extending the SCM adoption date to June 2000.

Response: With regard to adding more subcategories for nonflats, the commenter is referred to the response to comment #2-12. Regarding extending the 2002 limits to 2004, dropping the 2006 limits, and extending the SCM adoption date to June 2000, the commenter is referred to the responses to comments #2-1 and #3-2.

COMMENT LETTER #17
Metropolitan Water District of Southern California (MWD)
July 7, 1999

17-1. Comment: The ARB should more closely align the proposed SCM to match the SCAQMD's Rule 1113. The proposed SCM should include an essential public service coating (EPSC) category analogous to that in Rule 1113.

Response: The ARB staff has conducted a thorough technology assessment of the proposed limit for IM coatings. Based on our review, we have concluded that coatings that meet the proposed limit are technologically and commercially available and that such complying coatings perform as well as higher VOC IM coatings. To allow time for essential public service agencies to complete administrative processes before low VOC coatings can be used, we have delayed the proposed effective date until January 1, 2004. This extension would avoid the need to provide essential public services a higher VOC limit until they receive approval to use complying coatings. Although the time frame for compliance is not exactly the same as the SCAQMD's EPSC category, the additional time should provide the relief the commenter is seeking.

17-2. Comment: Compliant IM coatings that can meet the 2002 and 2006 limits may not be available.

Response: The commenter is referred to the response to comment #17-1.

17-3. Comment: MWD has established a rigorous performance-testing program to evaluate coatings prior to their approval for use on MWD structures. The process involves two to three years of lab testing and an additional three years of field testing. The proposed SCM limits will have a severe impact on MWD's approved coatings.

Response: The commenter is referred to the response to comment #17-1

17-4. Comment: To provide adequate time for the recommendation and testing of compliant low-VOC coatings, MWD recommends that an EPSC category with a limit of 340 g/l until 2006.

Response: The commenter is referred to the response to comment #17-1.

17-5. Comment: Once the proposed SCM IM limits go into effect, MWD will not be able to patch and repair previously painted structures with high VOC paint. As a result, MWD may have to strip the structure and repaint, resulting in higher VOC emissions.

Response: The commenter is referred to the response to comment #17-1. The delayed proposed effective date will apply to all IM uses, including patch and repair.

17-6. Comment: The proposed EPSC category and modified VOC content limit would help alleviate this concern.

Response: The commenter is referred to the response to comment #17-1.

17-7. Comment: Attachment 3 – Architectural Coatings - % reduction in coatings at 2002 and 2006 limits.

Response: Comment noted.

17-8. Comment: Attachment 3 – Immersion Coatings - % reduction in coatings at 2002 and 2006 limits.

Response: Comment noted.

COMMENT LETTER #18
State of California, Department of Transportation (Caltrans)
June 22, 1999

18-1. Comment: 90 percent of coatings used by Caltrans meet the proposed SCM IM 2002 limit. However, Caltrans still needs higher VOC coatings for some applications. There are no suitable replacement coatings for the necessary higher VOC coatings.

Response: The commenter is referred to the response to comment #17-1.

18-2. Comment: The 2002 limit of 250 g/l should be extended to 2005, and the 2006 limit of 100 g/l should be extended to 2008.

Response: The commenter is referred to the response to comment #17-1.

18-3. Comment: Alternatively, if dates cannot be delayed, the proposed SCM should include an ESPC category analogous to SCAQMD’s Rule 1113.

Response: The commenter is referred to the response to comment #17-1.

18-4. Comment: Caltrans could comply with the 250 g/l 2002 IM limit today if end-user averaging could be utilized.

Response: An optional averaging provision available to manufacturers of architectural coatings may be added to the SCM. However, averaging for end-users would not be enforceable, and probably would not be approvable by the U.S. EPA as a State Implementation Plan revision.

COMMENT LETTER #19
County Sanitation Districts of Los Angeles County (LACSD)
July 22, 1999

19-1. <u>Comment</u>: Coatings that perform well at other industrial facilities may not perform at wastewater facilities due to the unique, severely corrosive conditions that can exist.

<u>Response</u>: The commenter is referred to the response to comment #5-1.

19-2. <u>Comment</u>: If low and zero-VOC IM coatings perform satisfactorily in the lab and the field, LACSD will incorporate into its coating specifications. If problems arise, LACSD has been assured by the SCAQMD that Rule 1113 will be revised by raising limits and including exemptions.

<u>Response</u>: Comment noted.

19-3. <u>Comment</u>: LACSD seeks reassurance from the ARB that SCM will also be revised based on the outcome of the SCAQMD's technology assessments.

<u>Response</u>: We will closely monitor SCAQMD's work in this area, and conduct our own assessment one year before the 250 g/l limit goes into effect in 2004.

19-4. <u>Comment</u>: This provision is included as footnote c to Table 1 of the proposed SCM and should be included in the final SCM.

<u>Response</u>: We will recommend that the provision be included in the Board Resolution for the SCM if approved.

COMMENT LETTER #20
Multi-Agency
Metropolitan Water District of Southern California (MWD)
California Department of Water Resources (DWR)
State of California, Department of Transportation (Caltrans)
Los Angeles Department of Water and Power (LADWP)
July 21, 1999

20-1. Comment: The ARB should more closely align the proposed SCM to match the SCAQMD's Rule 1113. The proposed SCM should include an essential public service coating (EPSC) category analogous to Rule 1113.

Response: The commenter is referred to the response to comment #17-1.

20-2. Comment: Concerned with the availability of compliant IM coatings that can meet the 2002 and 2006 limits.

Response: The commenter is referred to the response to comment #17-1.

20-3. Comment: The agencies have established a rigorous performance-testing program to evaluate coatings prior to their approval for use on their structures. The process involves two to three years of lab testing and an additional three years of field testing. The proposed SCM limits will have a severe impact on the agencies' approved coatings.

Response: The commenter is referred to the response to comment #17-1.

20-4. Comment: To provide adequate time for the recommendation and testing of compliant low-VOC coatings, the agencies recommend an EPSC category with a limit of 340 g/l until 2006.

Response: The commenter is referred to the response to comment #17-1.

20-5. Comment: Once the proposed SCM IM limits go into effect, the agencies will not be able to patch and repair previously painted structures with high VOC paint. As a result, may have to strip the structure and repaint resulting in higher VOC emissions.

Response: The commenter is referred to the response to comment #17-5.

20-6. Comment: The proposed EPSC category and modified VOC content limit would help alleviate this concern.

Response: The commenter is referred to the response to comment #17-1.

20-7. Comment: Attachment 2 – Critical Application Usage Information – structural steel bridges.

Response: Comment noted.

20-8. Comment: Attachment 2 – Critical Application Usage Information – structural steel bridges.

Response: Comment noted.

20-9. Comment: Attachment 2 – Critical Application Usage Information – exterior structures holding, conveying potable water.

Response: Comment noted.

20-10. Comment: Attachment 2 – Critical Application Usage Information – structures that come into contact with potable water.

Response: Comment noted.

20-11. Comment: Attachment 2 – Critical Application Usage Information - structures that come into contact with chemicals designed to treat potable water.

Response: Comment noted.

20-12. Comment: Attachment 2 – Critical Application Usage Information – electric power conveyance systems.

Response: Comment noted.

20-13. Comment: Attachment 2 – Critical Application Usage Information – generating stations' equipment.

Response: Comment noted.

COMMENT LETTER #21
Department of Water Resources
July 13, 1999

21-1. Comment: The SCM should incorporate an essential public services category, as in SCAQMD Rule 1113.

Response: The commenter is referred to the response to comment #17-1.

COMMENT LETTER #22

Southern California Association of Governments

June 25, 1999

22-1. Comment: The Notice of Preparation of the Draft Program EIR for the SCM is not regionally significant per Areawide Clearinghouse criteria. Therefore, the project does not warrant clearinghouse comments at this time. A description of the project will be published in the July 1, 1999, Intergovernmental Review Report for public review and comment.

Response. Comment noted.

Public Workshop Comments

The following summarizes the CEQA-related comments received by the ARB at public workshops for the proposed SCM. The comments have been grouped by environmental topic. Responses to each comment are also included.

June 3, 1999

Water Resources Impacts

Comment #1: The use of waterborne technology to comply with the proposed SCM will result in coating equipment being cleaned up with water. The water use could result in water demand impacts. The disposal of waste material could also result in water quality impacts.

Response #1: The Draft Program EIR comprehensively analyzes the potential water demand impacts associated with the implementation of the proposed SCM. The analysis reveals that water demand impacts are negligible and insignificant. The commenter is referred to the Water Demand section of Chapter IV in the Draft Program EIR and the response to comment #2-14.

Additionally, the Draft Program EIR comprehensively analyzes the potential water quality impacts associated with the implementation of the proposed SCM. The analysis reveals that water quality impacts are negligible and insignificant. The commenter is referred to the Water Quality section of Chapter IV in the Draft Program EIR and the response to comment #2-15.

July 1, 1999 (CEQA Scoping Meeting)

Schedule of the Draft Program EIR

Comment #1: The proposed SCM is moving too fast. The Draft Program EIR will not adequately address the environmental impacts associated with the proposed SCM based on the current schedule.

Response #1: The commenter is referred to the response to comment #2-1.

Reactivity

Comment #1: The Draft Program EIR must analyze the reactivity characteristics of each airshed to determine if the proposed SCM will result in negative reactivity problems.

Response #1: The commenter is referred to the responses to comments #1-1 through #1-8, the Air Quality existing setting section of Chapter III, and the More Reactivity section of Chapter IV in the Draft Program EIR.

Alternatives

Comment #1: The Draft Program EIR should consider an alternative where the VOC content and compliance deadlines of coatings vary.

Response #1: The Extended Compliance Deadline Alternative has been included as one of the feasible alternatives to the SCM, and is analyzed in Chapter V of the Draft Program EIR. Also, the current version of the proposed SCM incorporates many of industry’s recommendations regarding varying VOC content limits, is also discussed in Chapter V of the Draft Program EIR.

September 8, 1999

Increase in VOCs as a Result of the Use of Low-VOC Compliant Coatings

Comment #1: The 250 g/l VOC content limit for IM coatings is too low and will lead to frequent recoating.

Response #1: The commenter is referred to the response to comment #16-1 and the More Frequent Recoating section of Chapter IV in the Draft Program EIR.

Hazards Impacts

Comment #1: The use of acetone as a replacement solvent will increase hazards impacts (*e.g.*, flammability issues).

Response #1: The potential hazards impacts associated with the use of acetone as a replacement solvent have been extensively analyzed in the Hazards section of Chapter IV in the Draft Program EIR.

APPENDIX D

DESCRIPTION AND TECHNICAL ASSESSMENT OF THE COATING CATEGORIES

Note: This Appendix now appears as Chapter VI of the *Staff Report for the Proposed Suggested Control Measure for Architectural Coatings*.

APPENDIX E

SUMMARY TABLES OF COATING CHARACTERISTICS

Note: Due to the nature of the revisions to these tables, they have been replaced in their entirety for clarity.

TABLE E-1

Lacquers > 680 g/l (13 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Appearance	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Devoe Paint DE-VO-LAC Pre-Catalyzed Clear Lacquer #59121 Gloss	719	20.0	350-400	Clear Gloss	½ hr	n/a / 1 yr
2	Devoe Paint DE-VO-LAC Pre-Catalyzed Clear Lacquer #59122 Semigloss	719	20.0	350-400	Clear Semi-Gloss	½ hr	n/a / 1 yr
3	Devoe Paint DE-VO-LAC Pre-Catalyzed Clear Lacquer #59123 Satin	719	20.0	350-400	Clear Satin	½ hr	n/a / 1 yr
4	Devoe Paint DE-VO-LAC Pre-Catalyzed Clear Lacquer #59125 Flat	719	20.0	350-400	Clear Flat	½ hr	n/a / 1 yr
5	Rodda Paint Crystal-Clear Lacquer	719	13.4	200-300	Clear Satin, Semi-Gloss, & Gloss	½ hr	n/a / 1 yr
6	Devoe Paint DE-VO-LAC Moisture Resistant Clear Cabinet Lacquer #59520 Sanding Sealer	707	16.0-23.0	300-350	Clear Light Amber Satin	½ hr	n/a / 1 yr
7	Devoe Paint DE-VO-LAC Moisture Resistant Clear Cabinet Lacquer #59521 Gloss	707	16.0-23.0	300-350	Clear Gloss	½ hr	n/a / 1 yr
8	Devoe Paint DE-VO-LAC Moisture Resistant Clear Cabinet Lacquer #59522 Semi-Gloss	707	16.0-23.0	300-350	Clear Semi-Gloss	½ hr	n/a / 1 yr
9	Devoe Paint DE-VO-LAC Moisture Resistant Clear Cabinet Lacquer #59523 Satin	707	16.0-23.0	300-350	Clear Satin	½ hr	n/a / 1 yr
10	Devoe Paint DE-VO-LAC Moisture Resistant Clear Cabinet Lacquer #59524 Rubbed Effect	707	16.0-23.0	300-350	Clear Rubbed Effect	½ hr	n/a / 1 yr
11	Rodda Paint Mar-Resist Lacquer #693 Gloss	687	19.0	275	Clear Amber Gloss	½ hr	n/a / 1 yr
12	Rodda Paint Mar-Resist Lacquer #694 Semi-Gloss	687	19.0	275	Clear Amber Semi-Gloss	½ hr	n/a / 1 yr
13	Rodda Paint Mar-Resist Lacquer #695 Satin Flat	687	19.0	275	Clear Amber Satin-Flat	½ hr	n/a / 1 yr
	Average Summary of Samples	**707**	**17.7**	**302**		**.5 hr.**	**n/a/ 1 yr**

Note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-2

Lacquers > 550 and ≤ 680 g/l (54 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Appearance	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Deft Clear Wood Finish Brushing Lacquer	680	18.0	350	Clear Gloss, Semi-Gloss, & Satin	2 hrs	n/a / 1 yr
2	Dunn Edwards 680 Crystaclear Water White Flat Lacquer LQX 134-0 Clear	680	15.3	350-400	Clear Flat	¾ hr	n/a / 1 yr
3	Dunn Edwards 680 Crystaclear Water White Gloss Lacquer LQX 132-0 Clear	680	15.6	350-400	Clear Gloss	¾ hr	n/a / 1 yr
4	Dunn Edwards 680 Crystaclear Water White Semi-Gloss Lacquer LQX 133-0 Clear	680	15.6	350-400	Clear Semi-Gloss	¾ hr	n/a / 1 yr
5	Dunn Edwards 680 Decolac High Solids Flat Lacquer LQX 105-0 Clear	680	18.8	250-300	Clear Flat	¾ hr	n/a / 1 yr
6	Dunn Edwards 680 Decolac High Solids Gloss Lacquer LQX 103-0 Clear	680	18.7	250-300	Clear Amber Gloss	¾ hr	n/a / 1 yr
7	Dunn Edwards 680 Decolac High Solids Semi-Gloss Lacquer LQX 104-0 Clear	680	18.5	250-300	Clear Amber Semi-Gloss	¾ hr	n/a / 1 yr
8	Dunn Edwards 680 High Hide Pigmented Gloss Lacquer LPX 301-1 White	680	17.3	250-300	White Gloss	¾ hr	n/a / 1 yr
9	Dunn Edwards 680 High Hide Pigmented Semi-Gloss Lacquer LPX 401-1 White	680	17.5	250-300	White Semi-Gloss	¾ hr	n/a / 1 yr
10	Frazee 726 Clear Dull Rubbed Lacquer: Interior	680	20.0	300	Clear Dull Rubbed	½ hr	n/a / 1 yr
11	Frazee 702 Clear Flat Lacquer: Interior Flat	680	20.0	300	Clear Flat	½ hr	n/a / 1 yr
12	Frazee 725 Clear Medium Rubbed Lacquer: Interior	680	20.0	300	Clear Medium Rubbed	½ hr	n/a / 1 yr
13	Frazee 724 Clear Satin Lacquer: Interior Satin	680	20.0	300	Clear Satin	½ hr	n/a / 1 yr
14	Frazee 721 Clear Semi-Gloss Lacquer: Interior Semi-Gloss	680	27.0	300	Clear Semi-Gloss	½ hr	n/a / 1 yr
15	Frazee 743 HI Solids Clear Gloss Lacquer: Interior Gloss	680	19.0	300	Clear Gloss	½ hr	n/a / 1 yr
16	Frazee 728 Non-Yellowing Satin Lacquer: Interior Satin	680	19.0	300	Clear Satin	½ hr	n/a / 1 yr
17	Frazee 703 Water White Flat Lacquer: Interior Flat	680	17.0	300	Water White Clear Flat	½ hr	n/a / 1 yr
18	Frazee 723 Water White Semi-Gloss Lacquer: Interior Semi-Gloss	680	17.0	300	Water White Clear Semi-Gloss	½ hr	n/a / 1 yr
19	Frazee 720 Water White Satin Lacquer: Interior Satin	680	20.0	300	Water White Clear Satin	½ hr	n/a / 1 yr
20	Frazee 744 Water White Gloss Lacquer: Interior Gloss	680	17.0	300	Water White Clear Gloss	½ hr	n/a / 1 yr

TABLE E-2 (CONTINUED)

Lacquers > 550 and ≤ 680 g/l (54 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Appearance	Drying time to recoat	Pot Life @70 deg./ Shelf Life
21	Sinclair Paint 2601N High Solids Clear Gloss Lacquer	680	14.5	300-400	Clear Gloss	½ hr	n/a / 1 yr
22	Sinclair Paint 2603N High Solids Clear Velvet Lacquer	680	23.4	300-400	Clear Velvet	½ hr	n/a / 1 yr
23	Sinclair Paint 2604N High Solids Clear Dead Flat Lacquer	680	17.3	250-350	Clear Dead Flat	½ hr	n/a / 1 yr
24	Sinclair Paint 2611N Water White Gloss Lacquer	680	17.4	250-300	Water White Clear High Gloss	½ hr	n/a / 1 yr
25	Sinclair Paint 2613N Water White Velvet Lacquer	680	14.6	200-350	Water White Clear Velvet	½ hr	n/a / 1 yr
26	Sinclair Paint 2614N Water White Dead Flat Lacquer	680	20.1	300-400	Water White Clear Dead Flat	½ hr	n/a / 1 yr
27	Sinclair Paint 2631N Crystal Clear Gloss Lacquer	680	18.5	250-300	Clear High Gloss	½ hr	n/a / 1 yr
28	Sinclair Paint 2634N Crystal Clear Flat Lacquer	680	18.5	250-350	Clear Dead Flat	½ hr	n/a / 1 yr
29	Akzo 60 Sheen S/G Lacquer	677	24.6	260	High sheen	1-2	n/a / 1 yr
30	Rodda Paint Cat-A-Lac Lacquer 633 Clear Satin	677	17.4	250-350	Clear Low gloss	½ hr	n/a / 1 yr
31	Rodda Paint Cat-A-Lac Lacquer 632 Clear Gloss	677	17.4	250-350	Clear High Gloss	½ hr	n/a / 1 yr
32	Rodda Paint Cat-A-Lac Lacquer 631 Clear Semigloss	677	17.4	250-350	Clear Semi-Gloss	½ hr	n/a / 1 yr
33	Wood Kote Crystal Kote Lacquers	676	20.0	350-450	Clear Satin	1 hr	n/a / 1 yr
34	Sinclair Paint 2612N Water White Semi-Gloss Lacquer	670	20.9	300-400	Water White Clear Semi-Gloss	½ hr	n/a / 1 yr
35	Sinclair Paint 2633N Crystal Clear Semi-Gloss Lacquer	665	18.5	250-350	Clear Semi-Gloss	½ hr	n/a / 1 yr
36	Devoe Paint DE-VO-LAC High Build Clear Lacquer #59721 Gloss	659	23.0	375-400	Clear Gloss	½ hr	n/a / 1 yr
37	Devoe Paint DE-VO-LAC High Build Clear Lacquer #59722 Semi-Gloss	659	23.0	375-400	Clear Semi-Gloss	½ hr	n/a / 1 yr
38	Devoe Paint DE-VO-LAC High Build Clear Lacquer #59723 Satin	659	23.0	375-400	Clear Satin	½ hr	n/a / 1 yr
39	Devoe Paint DE-VO-LAC High Build Clear Lacquer #59724 Rubbed Effect	659	23.0	375-400	Clear Rubbed Effect	½ hr	n/a / 1 yr
40	Devoe Paint DE-VO-LAC Interior Pigmented Lacquer #598XX Gloss	659	22.0	250-300	White Gloss	½ hr	n/a / 1 yr
41	Devoe Paint DE-VO-LAC Interior Pigmented Lacquer #598XX Semi-Gloss	659	22.0	250-300	White Semi-Gloss	½ hr	n/a / 1 yr
42	Devoe Paint DE-VO-LAC Super Build White Clear Lacquer #59620 Sanding Sealer	659	20.0	375-400	Clear Satin	½ hr	n/a / 1 yr

TABLE E-2 (CONCLUDED)

Lacquers > 550 and ≤ 680 g/l (54 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Appearance	Drying time to recoat	Pot Life @70 deg./ Shelf Life
43	Devoe Paint DE-VO-LAC Super Build White Clear Lacquer #59621 Gloss	659	25.0	375-400	Clear Gloss	½ hr	n/a / 1 yr
44	Devoe Paint DE-VO-LAC Super Build White Clear Lacquer #59622 Semi-Gloss	659	25.0	375-400	Clear Semi-Gloss	½ hr	n/a / 1 yr
45	Devoe Paint DE-VO-LAC Super Build White Clear Lacquer #59623 Satin	659	25.0	375-400	Clear Satin	½ hr	n/a / 1 yr
46	Devoe Paint DE-VO-LAC Super Build White Clear Lacquer #59624 Rubbed Effect	659	25.0	375-400	Clear Rubbed Effect	½ hr	n/a / 1 yr
47	Frazee 741 Clear Gloss Lacquer: Interior Gloss	640	26.0	300	Clear Gloss	½ hr	n/a / 1 yr
48	Sinclair Paint 2602N High Solids Clear Semi-Gloss Lacquer	640	24.1	350-450	Clear Semi-Gloss	½ hr	n/a / 1 yr
49	Rodda Paint Cat-A-Lac Lacquer Pigmented	623	24.0	275	Pigmented	¾ hr	n/a / 1 yr
50	Frazee 714 Low VOC Pigmented Flat Lacquer: Interior Flat	600	35.0	300	Pigmented Flat	½ hr	n/a / 1 yr
51	Frazee 754 Low VOC Pigmented Gloss Lacquer: Interior Gloss	600	35.0	300	Pigmented Gloss	½ hr	n/a / 1 yr
52	Frazee 734 Low VOC Pigmented Satin Lacquer: Interior Satin	600	35.0	300	Pigmented Satin	½ hr	n/a / 1 yr
53	Frazee 733 Pigmented Satin Lacquer: Interior Satin	600	35.0	300	Pigmented Satin	½ hr	n/a / 1 yr
54	Pittsburgh Paints Speedhide 6-10 Quick-Drying Interior Sanding Sealer & Finish	560	26.6	500-700	Clear satin to Gloss	2-3 hrs	n/a / 1 yr
	Average Summary of Samples	**664.3**	**21.3**	**304.8**		**0.7**	**n/a/ 1 yr**

Note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-3

Lacquers ≤ 550 g/l (41 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Appearance	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Akzo Sheen HS Acetone Topcoat	550	30.5	300	High Sheen	1-2	n/a / 1 yr
2	Dunn Edwards 550 Decolac High Solids Flat Lacquer LQ 141-0 Clear	550	20.8	300-350	Clear Amber Flat	¾ hr	n/a / 1 yr
3	Dunn Edwards 550 Decolac High Solids Semi-Gloss Lacquer LQ 142-0 Clear	550	20.2	300-350	Clear Amber Semi-Gloss	¾ hr	n/a / 1 yr
4	Frazee 746 Low VOC Clear Gloss Lacquer: Interior Gloss	550	22.0	300	Clear Gloss	½ hr	n/a / 1 yr
5	Frazee 729 Low VOC Clear Semi-Gloss Lacquer: Interior Semi-Gloss	550	22.0	300	Clear Semi-Gloss	½ hr	n/a / 1 yr
6	Frazee 745 Non-Yellowing Clear Gloss Lacquer: Interior Gloss	550	19.0	300	Clear Gloss	½ hr	n/a / 1 yr
7	SPI Acetone L/VOV W/W-Gloss Lacquer	550	17				n/a / 1 yr
8	Dunn Edwards 550 Crystaclear Water White Flat Lacquer LQ 151-0 Clear	549	14.0	200-250	Clear Flat	¾ hr	n/a / 1 yr
9	Dunn Edwards 550 Crystaclear Water White Gloss Lacquer LQ 153-0 Clear	548	13.5	200-250	Clear Flat	¾ hr	n/a / 1 yr
10	Dunn Edwards 550 Crystaclear Water White Semi-Gloss Lacquer LQ 152-0 Clear	548	13.6	200-250	Clear Semi-Gloss	¾ hr	n/a / 1 yr
11	Dunn Edwards 550 Decolac High Solids Gloss Lacquer LQ 143-0 Clear	548	20.0	300-350	Clear Amber Gloss	¾ hr	n/a / 1 yr
12	Pittsburgh Paints Rez 77-30 Interior Acrylic Gloss	350	26.6	350-450	Clear Satin to Gloss	2-3 hrs	n/a / 1 yr
13	AFM Safecoat Acrylaq Interior	294	30.6	300-400	Gloss	2 hrs	n/a / 1 yr
14	Coatings Resource Semi-Gloss ACE Lacquer	276	18.8	300-400	Semi-Gloss	2 hrs	n/a / 1 yr
15	Pinnacle Waterborne Acrylic 135 Series	275	33.0	400-500	Gloss	1–2 hrs	n/a / 1 yr
16	Rodda Paint Aqua-Lac-2000 #895 Satin	275	29.0	200-300	Clear Satin	½ hr	n/a / 1 yr
17	Rodda Paint Aqua-Lac-2000 #894 Semi-Gloss	275	29.0	200-300	Clear Semi-Gloss	½ hr	n/a / 1 yr
18	SPI Acetone Based Clear Gloss Lacquer	275	24.5	200-300	Gloss	1 hr	n/a / 1 yr
19	Trinity Coatings LW-4000 Aqualc White Waterborne Lacquer	256	32.2	517	White Gloss	1 hr	n/a / 1 yr
20	Trinity Coatings LW-4000S Aqualc White Waterborne Lacquer	256	32.2	517	White Semi-Gloss	1 hr	n/a / 1 yr
21	Trinity Coatings LW-4000N Aqualc White Waterborne Lacquer	256	32.2	517	White Satin	1 hr	n/a / 1 yr
22	Trinity Coatings LW-4025 Aqualc Black Waterborne Lacquer	254	30.1	484	Black Gloss	¾ hr	n/a / 1 yr

TABLE E-3 (CONCLUDED)

Lacquers ≤ 550 g/l (41 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Appearance	Drying time to recoat	Pot Life @70 deg./ Shelf Life
23	Trinity Coatings LW-4025S Aqualc Black Waterborne Lacquer	254	30.1	484	Black Semi-Gloss	¾ hr	n/a / 1 yr
24	Trinity Coatings LW-4025N Aqualc Black Waterborne Lacquer	254	30.1	484	Black Satin	¾ hr	n/a / 1 yr
25	Trinity Coatings LW-600 Series Aqualc Clear Waterborne Lacquer	242	29.0	450	Clear Amber Gloss	½ hr	n/a / 1 yr
32	Sinclair paint WL 14-4 Clear Acrylic Lacquer	240	31.0	300-350	Clear Gloss	2 hrs	n/a / 1 yr
33	Trinity Coatings LW-500 Series Aqualc Clear Waterborne Lacquer	105	29.0	450	Clear Gloss	½ hr	n/a / 1 yr
34	Trinity Coatings LW-501 Series Aqualc Clear Waterborne Lacquer	105	29.0	450	Clear Semi-Gloss	½ hr	n/a / 1 yr
35	Trinity Coatings LW-502 Series Aqualc Clear Waterborne Lacquer	105	29.0	450	Clear Satin	½ hr	n/a / 1 yr
36	Trinity Coatings LW-503 Series Aqualc Clear Waterborne Lacquer	105	29.0	450	ClearFlat	½ hr	n/a / 1 yr
37	Devoe Paint DE-VO-LAC Waterborne Clear Lacquer #59021 Gloss	96	30.0-36.0	400-450	Clear Gloss	½ hr	n/a / 1 yr
38	Devoe Paint DE-VO-LAC Waterborne Clear Lacquer #59022 Semi-Gloss	96	30.0-36.0	400-450	Clear Semi-Gloss	½ hr	n/a / 1 yr
39	Devoe Paint DE-VO-LAC Waterborne Clear Lacquer #59023 Satin	96	30.0-36.0	400-450	Clear Satin	½ hr	n/a / 1 yr
40	Devoe Paint DE-VO-LAC Waterborne Clear Lacquer #59020 Sanding Sealer	84	30.0-36.0	400-450	Clear Flat	½ hr	n/a / 1 yr
41	Trinity Coatings LW-4100 Aqualc Ultra White Waterborne Lacquer	64	30.1	484	Gloss White	¾ hr	n/a / 1 yr
	Average Summary of Samples	**301.9**	**26.8**	**363**		**1.0**	**n/a /1 yr**

Note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-4

Flats > 250 g/l (3 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability/ Washability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Sinclair Paint 2300 Woodex	<420	65.7	300-400		12-18 hrs	n/a / -
2	Devoe Paint Velour Flat Interior Alkyd Wall Paint #21XX	372	50.0	400	Excellent Washability	Overnight	n/a / 1 yr
3	Rodda Paint Ext Alkyd Flat House Paint	362	53.3	460		16-24 hrs	n/a / -
	Average Summary of Samples	**367**	**56.3**	**403**		**17.5**	**n/a/ 1 yr**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-5

Flats 250 - 100 g/l (97 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability/ Washability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Sinclair Paint 5600 Pro-Tech Maintenance Flat	250	36.2	300-400		4 hrs	n/a / -
2	Vista Paint 2800 Coverall Exterior Flat	250	42.0	250-400		4-6 hrs	n/a / 1 yr
3	Benjamin Moore Colorscapes Latex Flat 515	<250	36.0	400-450	Washable	2-3 hrs	n/a / -
4	Benjamin Moore MoorLife Latex House Paint 105	<250	35.0	300-400		4 hrs	n/a / -
5	Benjamin Moore Super Craft Latex Flat 290	<250	23.0	400-450		2-3 hrs	n/a / -
6	Benjamin Moore Super Hide Latex Flat 282	<250	25.0	400-450	Washable	2-3 hrs	n/a / -
7	Benjamin Moore Super Spec 100% Acrylic Exterior Flat Finish 180	<250	32.0	300-450		3 hrs	n/a / -
8	Benjamin Moore Super Spec Exterior Latex Flat Finish 189	<250	31.0	300-375		3 hrs	n/a / -
9	Benjamin Moore Super Spec Flat Latex House Paint 171	<250	32.0	350-450		3 hrs	n/a / -
10	Benjamin Moore Super Spec Latex Flat 275	<250	30.0	400-450	Washable	2-3 hrs	n/a / -
11	Colony 8300 10 Year Flat Latex Wall Paint	<250	31.0	400	Washable	2-4 hrs	n/a / -
12	Colony 8500 10 Year Flat Latex House Paint	<250	31.0	400		4-6 hrs	n/a / -
13	Colony 8600 Latex Floor Paint	<250	27.0	350-400		4-8 hrs	n/a / -
14	Colony 9300 5 Year Flat Latex Wall Paint	<250	32.0	400	Good	2-4 hrs	n/a / -
15	Colony 9500 5 Year Flat Latex House Paint	<250	32.0	400		4-6 hrs	n/a / -
16	Pittsburgh Paints 12-600 Exterior/Interior Masonry Paint Flat Latex	<250	25.3	150-300		4 hrs	n/a / -
17	Pittsburgh Paints 50-35 Latex Flat Ceiling Paint	<250	29.0	400-500		>4 hrs	n/a / -
18	Pittsburgh Paints 59-75 Professional Finishes Interior Flat Latex Paint	<250	20.5	400-500		4 hrs	n/a / -
19	Pittsburgh Paints 8-73 Exterior Flat Latex Ranch, Barn, and Roof	<250	27.8	300-400		2 hrs	n/a / -
20	Pittsburgh Paints Hide-A-Spray 91-20 Hi-Build Interior Latex Flat Spray Paint	<250	36.5	150-250	Washable & Scrubbale	6 hrs	n/a / -
21	Pittsburgh Paints Manor Hall 86-Line Interior Flat Acrylic Latex Wall & Trim	<250	34.7	400-450	Highly Washable & Scrubbable	4 hrs	n/a / -
22	Pittsburgh Paints Pitt-Cryl 10-Line Exterior Water Base Paint	<250	36.8	300-400		4 hrs	n/a / -
23	Pittsburgh Paints Speedcraft 5-650 Series Vinyl Acrylic Latex House Paint	<250	25.0	300-400		4 hrs	n/a / -

TABLE E-5 (CONTINUED)

Flats 250 - 100 g/l (97 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability/ Washability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
24	Pittsburgh Paints Speedcraft 5-70 Series Interior Flat Latex	<250	28.4	200-400		>4 hrs	n/a / -
25	Pittsburgh Paints Speedhide 6-610 Series Latex Interior Flat Wall Paint	<250	36.6	300-400		4 hrs	n/a / -
26	Pittsburgh Paints Speedhide 6-70 Series Latex Interior Flat Wall Paint	<250	31.4	400		>4 hrs	n/a / -
27	Pittsburgh Paints Speedhide 6-753 Flat Black Latex Paint	<250	34.2	400-450		16 hrs	n/a / -
28	Pittsburgh Paints Speedpro 14-110 Series Interior Wall and Ceiling Flat Latex	<250	28.3	400-500		>4 hrs	n/a / -
29	Pittsburgh Paints Speedpro 14-650 Interior/Exterior Flat Latex Paint	<250	24.3	250-350		4 hrs	n/a / -
30	Pittsburgh Paints Sun-Proof 72-Line House Paint	<250	33-38	250-400		4 hrs	n/a / -
31	Pittsburgh Paints Walhide 80-Line Wall Flat Latex Paint	<250	31.5	450		4 hrs	n/a / -
32	Pittsburgh Paints Wallfresh 68-35 Latex Flat Ceiling Paint	<250	20.8	400-500		4 hrs	n/a / -
33	Pittsburgh Paints Wallfresh 68-45 Interior Flat Latex	<250	25.1	400-500		>4 hrs	n/a / -
34	Pittsburgh Paints Weatherfresh 73-110 Series Exterior Flat Latex House Paint	<250	25.1	300-400		4 hrs	n/a / -
35	Sinclair Paint 1100 Lo-Sound	<250	30.9	350-450		1-2 hrs	n/a / -
36	Sinclair Paint 1300 Stuc-O-Life	<250	36.6	300-400		4 hrs	n/a / -
37	Sinclair Paint 1700 Sinwall	<250	34.2	350-450		4 hrs	n/a / -
38	Sinclair Paint 2000 Plast-O-Life	<250	36.6	300-400		4 hrs	n/a / -
39	Sinclair Paint 2500 Sinwall Plus	<250	36.5	350-450		4 hrs	n/a / -
40	Sinclair Paint 4100 Production EZ Flat	<250	33.2	250-350		4 hrs	n/a / -
41	Sinclair Paint 4300 Custom Interior Flat	<250	31.0	300-400		4 hrs	n/a / -
42	Sinclair Paint 5500 Production Heavy Flat	<250	38.6	250-400		4 hrs	n/a / -
43	Sinclair Paint 900 Plex-O-Life	<250	40.9	350-450		4 hrs	n/a / -
44	Tru-Test E-Z Kare Interior Latex Flat Finish EZF-line	<250	39.4	400	Washable	2 hrs	n/a / -
45	Tru-Test Interior/Exterior Acrylic Accent Flat Finish AF-line	<250	31.9	400		Overnight	n/a / -
46	Tru-Test Premium Exterior Flat Latex Barn & Fence Paint 500-Line	<250	21.3	400		1-2 hrs	n/a / -
47	Tru-Test Value Flat Latex House Paint L-24 White	<250	28.7	350-400		½ hr	n/a / -
48	Tru-Test Value High-Hiding Latex Flat Wall Paint VF-Line	<250	31.7	350		2 hrs	n/a / -
49	Tru-Test Value Latex Flat Barn Paint L-240 White	<250	28.7	350-400		½ hr	n/a / -

TABLE E-5 (CONTINUED)

Flats 250 - 100 g/l (97 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability/ Washability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
50	Tru-Test Weatherall All Acrylic Latex Flat House Paint HPX-Line	<250	35.9	400		Overnight	n/a / -
51	Valspar Pro Quality 500 Exterior Latex Flat House Paint	<250	33.0	350-400		4 hrs	n/a / 1 yr
52	Valspar Architectural 800 Latex Wall Paint	<250	34.0	400	Good	4 hrs	n/a / -
53	Valspar Pro Quality 200 Latex Interior Flat	<250	31.0	350-450		4 hrs	n/a / -
54	Valspar Pro Quality 250 Latex Interior Flat	<250	41.0	350-450		4 hrs	n/a / -
55	Valspar Pro Quality 590 Exterior Latex Masonry Paint	<250	32.0	250-400		4 hrs	n/a / 1 yr
56	Vista Paint 013 Acoustic Vinyl Flat	<250	47.4	50 – 250		4 hrs	n/a / -
57	Vista Paint 1000 Duraglide	<250	40.6	300-400	Outstanding Washability	4 hrs	n/a / -
58	Vista Paint 2000 Duratone	<250	39.6	300-400	Excellent Stain Removal	4-6 hrs	n/a / -
59	Vista Paint 3500 Breeze Wall	<250	41.5	350-450	Washable	2 hrs	n/a / -
60	Vista Paint 3600 Maintenance Flat	<250	34.1	400-500		2 hrs	n/a / -
61	ICI-Dulux Ultra-Hide Durus Exterior Acrylic Flat Finish	241	34.0	300-400		4 hrs	n/a / 1 yr
62	Devoe Paint Wonder-Speed Flat Interior Latex Wall Paint #506XX	219	31.0	400	Very Good >200 cycles	2 hrs	n/a / 1 yr
63	ACE Quality Paints 5* Flat Latex Wall Paint	215	32.9	400	Washable	2-4 hrs	n/a / -
64	Benjamin Moore Regal Wall Satin 215	<215	33.0	400-450	Optimal Scrubability	1-2 hrs	n/a / -
65	ACE Quality Paints 7* Flat Latex Ceiling White	213	38.8	400		2-4 hrs	n/a / -
66	Devoe Paint Wonder Tones Flat Interior Latex Wall Paint #36XX	203	34.0	300-400	Excellent >400 cycles	2 hrs	n/a / 1 yr
67	ACE Quality Paints 7* Flat Latex Wall Paint	198	41.5	400	Scrubbable	2-4 hrs	n/a / -
68	Sherwin Williams EverClean Latex Interior Flat	152-215	42.0	400	80% Reflectance @ 100 Cycles	4 hrs	n/a / -
69	ACE Quality Paints 5* Flat Latex Ceiling Paint	175	32.7	400	Washable	2-4 hrs	n/a / -
70	Sherwin Williams SuperPaint Interior Flat Latex	175	-	350-400	Our Most Washable		n/a / -
71	Frazee Luxwall Heavy Duty Interior Vinyl-Acrylic Flat Finish	165	-	150-350		12 hrs	n/a / 2 yrs
72	Frazee Luxwall Ready-To-Use Interior Vinyl-Acrylic Flat Finish	165	-	150-350		12 hrs	n/a / 2 yrs
73	Devoe Paint SPRA-MAX-12 Flat Interior Medium Build Latex Coating #458XX	158	29	80-110	Excellent Washability	4 hrs	n/a / 1 yr
74	ICI-Dulux Professional Exterior 100% Acrylic Flat Finish	156	37.0	300-400		2-3 hrs	n/a / 1 yr

TABLE E-5 (CONCLUDED)

Flats 250 - 100 g/l (97 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability/ Washability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
75	ACE Quality Paints 5* Acrylic Latex House Paint	143	31.6	400		2-4 hrs	n/a / -
76	ACE Quality Paints 7* Acrylic Latex House Paint	143	31.6	400	Exterior	2-4 hrs	n/a / -
77	ICI-Dulux Ultra-Hide Durus Exterior Acrylic Flat Masonry Finish	143	36.0	400-500		4 hrs	n/a / 1 yr
78	ACE Quality Paints Pro High Hiding Flat Latex Wall Paint	141	26.5	400		3 hrs	n/a / 1 yr
79	Evr-Gard E400	131	-	300-400	Good	4 – 6 hrs	n/a / 1 yr
80	Frazee Acri-Kote Exterior 100% Acrylic Finish	131	-	75-400		5-6 hrs	n/a / 1 yr
81	Evr-Gard E400	128	-	300-400	Good	4 – 6 hrs	n/a / 1 yr
82	ICI-Dulux Speed-Cote Exterior Acrylic Flat Finish	128	26.0	300-400		4 hrs	n/a / 2 yrs
83	Sherwin Williams A-100 Exterior Latex Flat	96-156	-	350-400		4 hrs	n/a / -
84	Frazee Versa-Tex Interior/Exterior Acrylic Copolymer Flat Finish	126	32.0	75-400		5-6 hrs	n/a / 1 yr
85	Devoe Paint Ceiling White Flat Interior Latex Paint #6001	125	25.0	350		2 hrs	n/a / 1 yr
86	Sherwin Williams SuperPaint Exterior Flat Latex	96-144	-	350-400		4 hrs	n/a / 1 yr
87	Dunn Edwards Acri-Flat Wall 100% Acrylic Wood Stain & Masonry Flat W 704	120	40.0	300-400		4 hrs	n/a / 1 yr
88	Rodda Paint Master Painter Latex Flat Wall Paint	120	34.7	300		2 hrs	n/a / 1 yr
89	Rodda Paint Velvet Flat Lasyn Wall Paint	120	34.4	290		2 hrs	n/a / 1 yr
90	Sherwin Williams Low Temp 35 Latex Exterior Flat	101-135	39.0	400		48 hrs	n/a / -
91	Frazee Velvin Interior Acrylic Copolymer Flat Finish	112	35.0	200-400	600-800 Scrub Cycles	3-4 hrs	n/a / 1 yr
92	Rodda Paint AC-911 Hi Hide Velvet Flat Latex House Paint	112	44.1	375		3 hrs	n/a / 1 yr
93	Frazee Royal Supreme Exterior 100% Acrylic Low Luster Finish	110	39.0	75-400		5-6 hrs	n/a / 1 yr
94	ICI-Dulux Exterior Latex Flat Finish	106	35.0	300-400		2-3 hrs	n/a / 2 yrs
95	Frazee Acri-Tec Exterior Acrylic Copolymer Flat Finish	105	38.0	75-400		5-6 hrs	n/a / 1 yr
96	AFM Safecoat Interior Flat	102	-	300-350		2 hrs	n/a / 1 yr
97	Frazee Duratec II 100% Acrylic Exterior Flat	102	43.0	75-400		6-8 hrs	n/a / 1 yr
	Average Summary of Samples	**152.1**	**32.8**	**361**		**4.3**	**n/a/ 1.1 yr**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content.
The mid-point of those values given as a range was used to calculate the average.

TABLE E-6

Flats < 100 g/l (38 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability/ Washability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Tru-Test Contractor's Latex Flat Wall Paint GF-Line	<100	26.7	350		2 hrs	n/a / -
2	ICI-Dulux Ultra-Hide Latex Flat Interior Wall Paint	98	31.0	400	Very Good Scrub Resistance	2-4 hrs	n/a / 1 yr
3	Rodda Paint AC-911 Ext Latex House Paint	96	38.3	325		3 hrs	n/a / -
4	Frazee Acoustic Ceiling Paint Interior Acoustic Flat Latex Finish	93	-	75-300		3-4 hrs	n/a / 2 yrs
5	ICI-Dulux Ultra Velvet Sheen Interior Flat Latex Wall & Trim Finish	92	39.0	400	Excellent Scrub Resistance	2-4 hrs	n/a / 1 yr
6	Devoe Paint SPRA-MAX-40 Flat Interior High Build Latex Coating #45XX	90	49.0	215	Excellent Scrub Resistance	4 hrs	n/a / 1 yr
7	Frazee Majestic Interior Acrylic Copolymer Velvet Flat Finish	89	40.0	200-400	1500-2000 Scrub Cycles	3-4 hrs	n/a / 2 yrs
8	Frazee Speedwall Plus Interior Vinyl-Acrylic Flat Finish	89	40.0	200-400	1500-2000 Scrub Cycles	3-4 hrs	n/a / 2 yrs
9	Dunn Edwards Evershield 100% Acrylic Wood & Masonry Flat W 701	85	35.0	200-450		4 hrs	n/a / -
10	ICI-Dulux Professional Velvet Matte Interior Flat Latex Wall & Trim Finish	85	35.0	400	Washable	2-4 hrs	n/a / 1 yr
11	Rodda Paint Krillicon Ext Flat Paint	85	38.6	325		3 hrs	n/a / 1 yr
12	ICI-Dulux Ultra-Hide Build-Dur Spray Latex Flat Interior Primer/Finish	83	32.0	200		4 hrs	n/a / 1 yr
13	Frazee Craftsman Heavy Duty Interior Vinyl Flat Finish	77	-	150-350		3-4 hrs	n/a / 2 yrs
14	Rodda Terra Solid Color Latex Flat	76	41.3	340		3 hrs	n/a / -
15	Frazee Speedwall Interior Vinyl-Acrylic Flat Finish	72	-	150-350		3-4 hrs	n/a / 2 yrs
16	Dunn Edwards ProKote Plus Exterior Flat W 202	70	38.0	200-400	Good	1 hr	n/a / -
17	Rodda Paint Ezee Coat Flat Wall Paint	67	29.9	240		2 hrs	n/a / -
18	Dunn Edwards Decovel Interior Velvet Flat Wall Paint W 401	65	44.0	300-450	Exceptional	4 hrs	n/a / -
19	Sherwin Williams Classic 99 Interior Flat Latex Ceiling Paint	63	-	350-400		4 hrs	n/a / -
20	Devoe Paint DE-VO-KO Flat Interior Latex Wall Paint #378XX	61	25.0	350		2 hrs	n/a / 1 yr
21	Valspar Architectural 803 Flat Wall Paint	51	34.0	400	Good	4 hrs	n/a / 1 yr
22	ICI-Dulux Ultra-Wall Latex Flat Interior Wall Paint	50	28.0	400		2-4 hrs	n/a / 1 yr

TABLE E-6 (CONCLUDED)

Flats < 100 g/l (38 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability/ Washability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
23	ICI-Dulux Ultra-Hide High-Build Latex Flat Interior Primer/Finish	46	32.0	205-257		4 hrs	n/a / 1 yr
24	Devoe Paint Wonder-Hide Flat Interior Latex Wall Paint #519XX	33	26.0	350	Good >75 Cycles	2 hrs	n/a / 1 yr
25	ICI-Dulux Speed-Wall Latex Matte Flat Interior Wall Paint	33	25.0	400		2 hrs	n/a / 1 yr
26	Sherwin Williams StylePerfect Interior Flat Latex Ceiling Paint	33	-	350-400			n/a / -
27	Devoe Paint DE-VO-PRO Flat Interior Latex Wall Paint #534XX	31	25.0	350		2 hrs	n/a / 1 yr
28	Behr Premium Plus Interior Flat Smooth Wall Texture Paint	25	44	50-100		2 hrs	n/a / -
29	ICI-Dulux Speed-Cote Exterior Latex Flat Masonry Finish	22	24.0	400-500		4 hrs	n/a / 1 yr
30	ICI-Dulux Speed-Wall Latex Flat Interior Wall Paint	18	25.0	400		2 hrs	n/a / 1 yr
31	Sherwin Williams HealthSpec Low Odor Latex Interior Flat	1	-	400	Excellent Washability	4 hrs	n/a / -
32	Benjamin Moore Pristine Eco Spec Interior Latex Flat 219	0	32.0	400-450	Washable	2 hrs	n/a / -
33	Conlux Enviro-Plex 10400 Series	0	45.0 – 47.0	370-490			n/a / -
34	Dunn Edwards Sierra Low Odor/Zero VOC Flat Wall Finish W 501	0	36.0	300-450		2 - 4 hrs	n/a / -
35	Frazee Envirokote Interior Low Odor Zero VOC Flat Finish	0	32.0	200-400	Pass 500-600 Scrub Cycles	3-4 hrs	n/a / 2 yrs
36	ICI-Dulux Decra-Shield Exterior 100% Acrylic Finish	0	40.0	300-400		2-3 hrs	n/a / 1 yr
37	ICI-Dulux Lifemaster 2000 Interior Flat Finish LM 9100	0	34.0	400	Washable	2 hrs	n/a / 1 yr
38	Rodda Paint Horizon Clean Air Select	0	39.8	340	Washable	2 hrs	n/a / -
	Average Summary of Samples	**50.8**	**34.6**	**333**		**3.0**	**n/a/ 1.3 yr**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

NOTE: *Morton International, Vianova and Air Products are raw material manufacturers*

TABLE E-7

Floor Coatings - over 250 g/l (11 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
1	Ameron Amercoat® 335 (2 comp epoxy acrylic)	288	43+/-3	229	600* psi	Abrasion resistance 130 mg loss	1 year retention	8 hrs / 1 yr.
2	Benjamin Moore & Co. M43/ M44 Acrylic Epoxy Gloss Coating	297	36	380	n/a	Chemical, abrasion resistant	60-70@60 deg	8 hrs/ n/a
3	Dunn Edwards ULTRASHIELD® Aliphatic Polyurethane Enamel Pigmented IP 630	420	54	425-550	Good; Clean, Dry Surfaces	Chemical, impact resistance	90 + @60 deg; gloss retention	6-8 hrs / 1 yr
4	Kelly-Moore 1300 Industrial Maintenance Alkyd Floor Enamel	<420	49	300-400	n/a	Good durability, abrasion resistant	80@60 deg	n/a
5	Madison Chemical GemThane™ 1:4 Aliphatic	<340	75-78	333	800 psi	Chemical, abrasion resistant	Excellent UV resistance, gloss	1.5 hrs / 1 yr
6	Pittsburgh Paints 3-110 Urethane Fortified Alkyd Floor and Deck Enamel Interior/Exterior	373	51.3 +/ 2	400-500	Coat with Paint Thinner (1pt./gal)	Not resistant to high heat/ corrosion chemicals	75 @60 deg	n/a / 3 yrs
7	Pittsburgh Paints 3-814 Series – Exterior/Interior Floor and Deck Gloss-Oil Enamel	378	51.6 +/- 2	400-450	Back Roll if Sprayed	Not resistant to high heat chemicals	80 @60 deg	n/a / 3 yrs
8	Pittsburgh Paints Aquapon 97-51 Polyamide-Epoxy Tinting Base	463	47.2 +/- 2	246-369	Outstanding	Excellent abrasion, impact, chemical resistance	70 @60 deg; loss due to prolonged exterior exposure	12-24 hrs / 3 yrs
9	Pittsburgh Paints Aquapon 97-53,54,97 Polyamide-Epoxy Tinting Bases	<420	53.8 +/- 2	287-431	Apply to Dry, Clean Surface	Abrasion, impact, chemical resistant	70+ @60 deg ; loss due to prolonged exterior exposure	3.5-4 hrs / 3 yrs
10	Sherwin Williams Armorseal© 1000HS	330	65 +/- 2	206-350	865 psi*	Abrasion Resistant 64.8 mg loss	Gloss	4 hrs/ 3 yrs
11	Sherwin Williams Armorseal© Floor-Plex™ 7100 Water Based Epoxy Floor Coating	258	40 +/- 2	320-427	941 psi, Failure of Block *	Abrasion resistant 107 mg loss	Gloss	4 hrs/ 1 yr
	Average Summary of Samples	**350.9**	**51.6**	**361**				**6.8 hrs / 2.1 yrs**

* Test Method ASTM D4541

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average voc content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-8

Floor Coatings - from 250 g/l to 100 g/l (23 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
1	ACE Royal$_{TM}$ Satin Latex Floor & Patio Paint	250**	n/a	n/a	n/a	Abrasion, stain resistant	Satin	n/a
2	Advanced Polymer Sciences Guardline Concrete Corrosion Resistant (Siloxirane)	102	91	490 (70 ft^2@ 21-24 mil specified)	500 psi	15,000 psi hydroblast	UV resistance 40+ yrs	30 mins / 1 yr
3	Air Products ADURA™ 200	173	61	150-400	Excellent	Abrasion resistance 100 mg loss	95 @60 deg	5.5 hrs/ 1 yr
4	Behr Expressions Interior/ Exterior Porch and Floor Low-Lustre Enamel	209-234	29.3-34.2	400	Excellent	Scuffing, fading, cracking, peeling, blistering resistant	5-15 @60 deg	n/a
5	Behr Premium Plus Interior/ Exterior Porch and Floor Gloss Enamel	236-250	31-35	400	Excellent	Scuffing, fading, cracking, peeling, blistering resistant	65+ @60 deg	n/a
6	Behr Premium Plus Interior/ Exterior Porch and Floor Low-Lustre Enamel	209-234	29.3-34.2	400	Excellent	Scuffing, fading, cracking, peeling, blistering resistant	5-15 @60 deg	n/a
7	Dutch Boy Garage Floor Acrylic/Polyurathane Enamel White	150**	n/a	n/a	n/a	Blistering resistant	n/a	n/a
8	EPOXI Tech EPOXY Shield	250**	n/a	n/a	n/a	Chemical and salt resistant	n/a	n/a
9	EVR-GARD 800 Walk-A-Pon Vinyl Epoxy	126	36.1	200-300	Good	Alkali & abrasion resistance	Flat	n/a
10	ICI Dulux Ultra-Hide Interior/ Exterior 100% Acrylic Floor Enamel	111	40 +/- 1	300-350	Excellent	Abrasion, oil, washing resistant	4-11 @85 deg	n/a / 1+ yr
11	ICI Hot Traks Acrylic Latex	179**	n/a	n/a	n/a	n/a	n/a	n/a

TABLE E-8 (CONTINUED)

Floor Coatings - from 250 g/l to 100 g/l (23 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
12	ICI Ultra-Hide Floor & Porch Water Base 100% Acrylic	150**	n/a	n/a	n/a	n/a	n/a	n/a
13	Kelly-Moore 1350 Acry-Tred Acrylic Patio and Deck Paint	182	40	250-400	n/a	Good durability, color retention, abrasion resistance	10@60 deg	n/a
14	Litex® 2-Part Epoxy Waterbased Floor Coating	209**	n/a	n/a	n/a	Solvent and chemical resistant	n/a	n/a
15	Morton International MorKote™ 3000 (Acrylic concrete wall and floor)	114	36.9	193	n/a	4,000 scrubbing cycles	10 @60 deg	n/a / 1 yr
16	Pittsburgh Paints Aquapon WB 98-Line Waterborne Epoxy High Performance	230	38 +/- 2	203-305	Apply to clean, dry primed surface	Impact, abrasion, stain resistant	70+@60 deg	6 hrs / 5 yrs
17	Resene Armourcote 510 High Solid Epoxy	104	86	175-281	Will tolerate compromised surfaces	n/a	Semi-gloss	n/a
18	Sherwin Williams Armorseal® 700HS High Solids Water Based Epoxy Floor Coating	<120	96 +/- 2	200-230	>360 psi	Abrasion, chemical, moisture, solvent resistant	Gloss	40 min/ 1 yr
19	Sherwin Williams Corobond™ E.N. 6700 High Build Epoxy Novolac Coating	180	80 +/- 2	90-115	Excellent Adhesion	Protects against severe chemical attack	Semi-gloss	30 min/ 1.5 yrs
20	Sherwin Williams Armorseal® Tread-Plex™ 100% Acrylic Water Based Floor Coating	150	43 +/- 2	345-460	702 psi *	Abrasion resistant <37 mg loss	Semi-gloss	n/a/ 2 yrs
21	UGL Latex Base Drylock Concrete Floor Paint	250**	n/a	n/a	n/a	n/a	n/a	n/a
22	Vianova Daotan VTW 6470	<150	n/a	n/a	n/a	Chemical, impact, and abrasion resistant	92-104@60 deg	n/a

TABLE E-8 (CONCLUDED)

Floor Coatings - from 250 g/l to 100 g/l (23 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
23	Vianova Water-Based Epoxy White Topcoat #2	125	47.2	750	Excellent	Chemical, impact, abrasion resistant	n/a	5 hrs/ n/a
	Average Summary of Samples	**177.2**	**52.8**	**334**				**3.0 hrs / 1.7 yrs**

* Test method ASTM D4541
** Obtained from product label

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-9

Floor Coatings - 100 g/l or less (25 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
1	Advanced Polymer Sciences Underguard High Performance Concrete Sealer	0	100	290	Concrete >500 psi	15,000 psi hydroblast	Semi-clear.	15-30 mins / 1 yr
2	Air Products ADURA™ 50	30	47	200-400	>400** psi	Abrasion resistance 123 mg loss	78-89 @60 deg	2-3 hrs / 1 yr
3	Air Products ADURA™ 100	3	70	377	Good	Abrasion resistance 46.4 mg loss	95 @60 deg	3.5 hrs / 1 yr
4	Ameron PSX® 700 (2 comp Siloxane)	84	90 +/- 3	481	1000*psi	Abrasion resistance 53 mg loss	Retains 50% @ 26 wks	4 hrs / 1 yr.
5	Coatings Resources Corp. CR-10	0	100	150-400	1710 psi*	13,500 psi compresive	95 @60 deg	1 hr / 2yrs
6	Coatings Resources Corp. CR-11	0	100	150-400	Good	Abrasion resistant	90 @60 deg	1 hr / 2 yrs
7	Coatings Resources Corp. CR-13	0	100	150-400	1500 psi*	12,500 psi	High	1 hr / 2 yrs
8	Glass Shield Floor Guard 100 (2 comp polyurethane)	0	100	535	Excellent	Excellent	High gloss	30 mins / 2 yrs
9	Evercoat Skid-No-More	1.44	n/a	40-60	n/a	Long Lasting	n/a	n/a

TABLE E-9 (CONTINUED)

Floor Coatings - 100 g/l or less (25 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
10	Hart Polymers HP-100 (2-comp aliphatic polyurethane)	0	60-66	333	Pass*	Abrasion resistance <40 mg loss	>90 @60 deg	1.5-2 hrs / 1 yr
11	Hart Polymers HP-120 (2-comp epoxy/acrylic high gloss)	0	50	400-500	Pass*	Abrasion resistance <25 mg loss	Discolor from direct sunlight	2.5-3 hrs / 1 yr
12	Hart Polymers HP-320 (2-comp acrylic/epoxy)	0	55	300	Pass*	Abrasion resistance <25 mg loss	Discolor from direct sunlight	2.5-3 hrs / 1 yr
13	Hart Polymers HP-330 (2-comp epoxy)	0	100	500	Excellent	Abrasion resistance <25 mg loss	High gloss	45 mins / 1 yr
14	JASCO Stop-Slip Floor Coating	32	n/a	n/a	n/a	n/a	n/a	n/a
15	Pittsburgh Paints 3-510 Series – Latex Floor and Deck Enamel	97	38.3 +/- 2	400	No special surface preparation	Tough, durable film	5-40 @60 deg	n/a / 5 yrs
16	Resene Aquapoxy for Flooring	50	n/a	40-121	Excellent	Excellent	Full Gloss	1.5 hrs / n/a
17	Resene Tennis Court Coating	50	n/a	n/a	n/a	Excellent	n/a	n/a
18	Seal Krete Proformance Skid-Proof Anti-Skid Floor & Textured Wall Coating	0	n/a	33	n/a	Water, impact, salt, and chlorine resistant	n/a	n/a
19	Seal Krete Skid-Proof EZ-Coat (SPEZ)	<40	n/a	150	n/a	Water, impact, salt, and chlorine resistant	n/a	n/a
20	Sherwin Williams Acrylic Latex Floor Enamel A24 Series	72	34 +/- 2	400	Apply to clean, dry surfaces	Hard, durable finish	15-25 @60 deg	n/a
21	Sherwin Williams ArmorSeal® 650 SL/RC	0	100	50-160	Excellent	Abrasion, chemical, impact resistant	High gloss	40 min / 18 mo
22	Sherwin Williams Armorseal® Armor-Plex™ Waterbased Urethane Finish	41	58 +/- 2	309-464	941 psi ***	Abrasion resistance 45 mg loss	High Gloss	2 hrs / 1 yr
23	Sherwin Williams 650HB/RC 100% Solids Self-Leveling Epoxy	0	100	15-50	Excellent	Abrasion, chemical, impact resistant	Gloss	45 min / n/a

TABLE E-9 (CONCLUDED)

Floor Coatings - 100 g/l or less (25 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
24	Snow Roof Systems Safe T Kote®	<1	n/a	100	Apply to dry, clean surface	200 psi strength	n/a	n/a
25	Vianova BECKOPOX™ EP140 w/ Beckopox Special Hardener EH 623W	0	49	790	Excellent	Abrasion, chemical, impact, UV resistant	98 @60deg	4-8 hr / 1 yr
	Average Summary of Samples	**20**	**75.2**	**300**				**1.9 hrs / 1.6 yrs**

* Test method ASTM D2197
* * Test method ASTM D4541-85
*** Test method ASTM D4541
note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-10

Industrial Maintenance Coatings - from 420 g/l to 250 g/l (40 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
1	Ameron Amershield® Aliphatic Polyurethane (2 comp)	264 (323 thinned)	73 +/-3	234 (5 mil)	Excellent	Abrasion resistance, 60.2 mg loss	Retains gloss - 100 cleaning cycles	2.5 hrs / 1 yr
2	Ameron Amercoat® 450HS aliphatic polyurethane (2 comp)	287.5 (340 thinned)	66 +/- 3	530 (2 mil)	Prime steel, concrete	Excellent abrasion resistance	Excellent	4 hrs / 1 yr
3	Ameron Amercoat® 90HS Epoxy-Phenolic (2 comp)	323 (395 thinned)	64+/-3	257 (4 mil)	Prepare steel, concrete, aluminum, galvanized	Excellent chemical, weather protection	Flat	4 hrs / 1 yr
4	Ameron Amerthane ® 487 Elastomeric Polyurethane (2 comp)	276 (323 thinned)	68 +/- 3	1091 (1 mil) 54.5 (20 mil high build)	3500 psi (tensile strength)	Outstanding impact, abrasion/ good chemical, corrosion resistance	Semigloss	1 ¼ hrs / 6 months

TABLE E-10 (CONTINUED)

Industrial Maintenance Coatings - from 420 g/l to 250 g/l (40 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
5	Ameron Amercoat® 385 Multi-Purpose Epoxy Primer (2 comp)	276 (311 thinned)	66 +/- 3	265 (4 mil)	>1000* psi	Excellent immersion resistance - 1 yr after chemicals	Flat	3 hrs/ 1 yr
6	Ameron Amercoat® 185HS Universal Primer (single comp)	383 (407 thinned)	59 +/- 3	379 (2.5 mil)	Prepare steel, aluminum, galvanized	Protects against weathering	Flat	n/a / 1 yr
7	Ameron Amercoat® 5105 Alkyd Primer (single comp)	335 (383 thinned)	62 +/- 3	331 (3 mil)	Bare steel	Corrosion resistant	Flat	n/a / 1 yr
8	Ameron Dimetcote® 21-9 Inorganic Zinc Silicate Primer – Steel (2 comp)	293 (331 thinned)	n.d.	427 (3 mil)	500* psi	Corrosion resistant	Flat	4 hrs / 10 months
9	Ameron Amercoat® 68HS Zinc Rich Epoxy Primer (3 comp)	288 (335 thinned)	70 +/- 3	374 (3 mil)	Excellent	Chemical resistant	Flat	16 hrs / 1 yr
10	Ameron Amercoat® 370 Epoxy Primer (2 comp)	300 (359 thinned)	63 +/- 3	202 (5 mil)	>1000* psi	Corrosion resistant	Flat	4 hrs / 1 yr
11	Dunn Edwards Paints Enduragloss 42-53 (single comp)	420	47	400-475	Clean, dull surfaces	Abrasive; corrosion resistant	85 –90 @ 60 deg.	n.a / n.d.
12	Dunn Edwards Low Sheen Pigmented Z 6243 (2 comp)	340	64.7	500-600	Clean, dull surfaces	Very good chemical; excellent stain resistance	20-25 @ 60 deg Low sheen	8-10 hrs / 1 yr
13	Dunn Edwards SYN-LUSTRO® High Performance Alkyd Gloss Enamel – 10 Series	395	51	400-425	Apply to clean, dry surfaces	Abrasion resistant	85-90 @ 60 deg	n.a / n.d.
14	Dunn Edwards Paints Ultrashield IP630 (2 comp)	420	54	425-550	Clean, dull surfaces	Abrasion resistance, 100 mg loss	90 @ 60 deg	6-8 hrs / n.d.
15	ICI Devoe Speed Enamel #4110	420	45 +/- 1	300-400	Excellent⅄	Excellent corrosion resistance	Flat	N/a / 1 yr
16	ICI Devoe Speed Enamel #4318	383	49+/-1	300-400	Excellent ⅄	Good ✪	85 @ 60 deg	n.a / 1 yr

TABLE E-10 (CONTINUED)

Industrial Maintenance Coatings - from 420 g/l to 250 g/l (40 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
17	Madison Chemical Gemthane Precatalyzed Aliphatic Exterior Coating	320	68	350	Self-priming	Abrasion resistance, 82 mg loss	Resist weathering	n.d. / 1 yr
18	Madison Chemical Gemthane S (single comp)	282	72	383	Apply to clean surfaces	Abrasion resistance, 60 mg loss	Suitable to chemical exposure	1-2 hrs / 1 yr
19	Pittsburgh Paints 7-814 Industrial Gloss-Oil Interior/Exterior Enamel	420	51.3 +/- 2	350-500	Paint only in dry weather	Long lasting durability	75 @ 60 deg gloss will decrease with time	n.a/n.d .
20	Pittsburgh Paints 97-480 Silicone-Alkyd Finish Coatings	420	46.9 +/-2	346 (2 mil)	Prepare, prime surface	Heat/chalk resistant	85 @ 60° excellent gloss retention	n.a./n. d.
21	Pittsburgh Paints 7-824 Industrial Interior Alkyd Low-Lustre Enamel	420	45.1 +/- 2	300-400	Easy application/ excellent flow and leveling	Excellent blocking resistance	25-35 @ 60 deg	n.a./n. d
22	Pittsburgh Paints 7-844 Industrial Interior Alkyd Semi-Gloss Enamel	420	45.6 +/- 2	n.d.	Easy application/ excellent flow and leveling	Excellent blocking resistance	50-75 @ 60 deg	n/a / n.d
23	Pittsburgh Paints 7-852, 858 Industrial Rust Inhibitive Steel Primers	420	52.4 +/- 2	390-535	Ferrous metals only	Rust inhibitive properties	Flat	n.a./n. d.
24	Pittsburgh Paints Lavax 23-Line Machinery Enamel	n.d.	51.6 +/- 2	350-400	Can withstand effects from, vibration, temp. changes	Durable, wear resistant	Eggshell	n.a./n. d.
25	Pittsburgh Paints Pitt-Glaze 16-Line High Solids Gloss Polyester-Epoxy Finish Coatings-Solvent (2 comp)	n.d.	65.6 +/- 2	175-265	Prime the surface	Chemical/ abrasion resistant	85 @ 60 deg	10 hrs / n.d.
26	Pittsburgh Paints Pitt-Glaze 16-Line High Solids Semi-Gloss Polyester-Epoxy Finish Coatings-Solvent (2 comp)	n.d.	63.1 +.- 2	175-265	Prime the surface	Chemical/ abrasion resistant	45-60 @ 60 deg	10 hrs / n.d.

TABLE E-10 (CONTINUED)

Industrial Maintenance Coatings - from 420 g/l to 250 g/l (40 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
27	Pittsburgh Paints Pitthane 97-840 High Build Acrylic Aliphatic Urethane (2 comp)	420	59.9 +/- 2	160-240	Apply to dry, clean, primed surfaces	Not hydrostatic pressure resistant	Exceptional gloss/ color retention	4 hrs/n.d.
28	Pittsburgh Paints Speedhide 6-252 Gloss Oil Interior/Exterior Enamel	n.d.	53.2 +/- 2	450	Prepare/prime surface	Great durability	Outstanding color retention	n.a./ n.d.
29	Pittsburgh Paints Tankhide 97-630 Alkyd Paint Finish Coatings	420	46.6 +/- 2	186-212	Apply to dry, clean, primed surfaces	Used for exterior metal surfaces	Gloss initially; chalks w/ weathering	n.a./ n.d.
30	Sure Coat Epoxigard (2 comp)	257	50	88	--	--	--	3 hrs /indef.
31	Tnemec Hi-Build Gloss Series 2H	384-422 (449 thinned)	49+/-2	524	Clean, dry, prime surfaces	Good flow, hiding, protection	Gloss	n/a / 1 yr
32	Tnemec Hi-Build Epoxoline Series 66 (2 comp)	362-395 (434 thinned)	56+/-2	150-299	Clean, dry surfaces	Bench-mark performance	Chalks w/ extended UV exposure	10 hrs / 1 yr
33	Tnemec Hi-Build Epoxoline II #69 (2 comp)	269-275 (329 thinned)	69+/-2	184-369	Clean, dry surfaces	Excellent abrasion resistance	Chalks w/ extended UV exposure	4-6 hrs / 1 yr
34	Tnemec Endura-Shield #71 (2 comp)	387-442 (528 thinned)	54+/-2	334-557	Clean, dry surfaces	Abrasion, corrosion, chemical resistant	Excellent gloss/ color retention	4 hrs / 1 yr
35	Tnemec Endura-Shield #74 (2 comp)	257-297 (342 thinned)	70+/-2	225-561	Clean, dry surfaces	Abrasion, corrosion, chemical resistant	Highly resistant to exterior weathering	2 hrs / 1 yr
36	Tnemec Versare Primers Series 4	342-383 (420 thinned)	54+/-2	247-433	Clean, dry surfaces	Rust inhibitive	Resistant to exterior exposure	n.a ./ 2 yrs
37	Tnemec Tneme-Zinc 90-97 (2 comp)	320 (370 thinned)	63+/-2	289-404	Blast, clean surface	Excellent performance	Possible multi-coats for desired hide/look	24 hr / 9 months
38	United Coatings Uniseal Water-based Epoxy Sealer (single comp)	330	14+/-1	250-400	Clean surfaces	Penetrates, seals porous substrates	Clear or black	n.a./ 1 yr

TABLE E-10 (CONCLUDED)

Industrial Maintenance Coatings - from 420 g/l to 250 g/l (40 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
39	United Coatings Alumiseal Rust Inhibitive Metal Primer (single comp)	420	55+/-2	250-300	Superior	Corrosion resistant	2000 hrs weather exposure	n.a. / 1 yr
40	Vista Paint 910 Red Oxide Metal Primer	340	43.8	250-350	Outstanding	Outstanding corrosion resistance	Flat	n.a./ n.d.
	Average Summary of Samples	**353**	**56**	**337**				**6.4 / 1.0**

*ASTM D4541 Test Method
⅄ASTM D3359-78 Test Method
✪ ASTM D4060 Test Method
note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-11

Industrial Maintenance Coatings - from 250 g/l to 100 g/l (20 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
1	Ameron Amercoat® 220 Acrylic (single comp)	180	35+/-3	280 (2 mil)	500 psi*	Abrasion resistance, 110 mg loss	Retains gloss - 1 year, excellent	n/a / 1 yr
2	Ameron Amercoat® 78HB Coal-Tar Epoxy (2 comp)	228 (300 thinned)	78 +/- 3	78 (16 mil)	Prepare/ prime steel/ concrete	Good abrasion resistance, immersion/ non-immersion, water, chemical resistance	Flat	4 hrs / 1 yr
3	Ameron Amerlock® 400 Epoxy (2 comp)	120-168 (240 thinned)	83 +/- 3 to 88 +/- 3	266-282	900* psi	Abrasion resistance, 102 mg loss	Semigloss; retains gloss - 750 hrs of humidity	1-5.5 hrs / 1 yr
4	Ameron Amercoat® 151 Acrylic Epoxy Primer (2 comp)	228	39+/-3	313	Good	Light-duty, excellent corrosion protection	Flat	24 hrs / 1 yr

TABLE E-11 (CONTINUED)

Industrial Maintenance Coatings - from 250 g/l to 100 g/l (20 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
5	Ameron PSX 700	120 (204 thinned)	90	206-481 (3-7 mil)	Excellent	Excellent corrosion, chemical, weather resistance	Gloss	4 hr / 1 yr
6	Envirocoat D45+ Polyurethane Acrylate (2 comp)	212-229 (ASTM D-3980)	33.5-44.4	177-258	Excellent, resists peeling	Excellent abrasion, uv resistance, long life	Clear or color, no peeling, cracking, blistering	n.a./ n.d.
7	Benjamin Moore Coal Tar Epoxy Coating M47/M48 (2 comp)	134	77	155	Excellent	Exceptional chemical resistance	n.d.	n.d./ n.d.
8	Benjamin Moore Epoxy Mastic Coating M45/M46 (2 comp)	213	75	300	Excellent	Immersion, fresh/salt water	20-40% Gloss	n.a./ n.d.
9	Coatings Resource Corp. CR-24 High Build Epoxy Tank Lining (2 comp)	196	75	150-400	Excellent	Chemical resistant	Medium gloss	2 hrs /n.d.
10	Pittsburgh Paints Pitt-Glaze 16-Line High Solids Acrylic-Epoxy Water Base Coatings (2 comp)	n.d.	44.9-45 +/-2	275-325	Prepare/ prime surface	Stain, chemical resistant	85+ @ 60°, 45-60 @ 60°	6 hrs / n.d.
11	Pittsburgh Paints Pitt-Guard 97-144 Direct-to-Rust Coating (2 comp)	n.d.	84.9 +/- 2	195-274	Prepare surface	Excellent performance	25-45 @ 60 deg-not controlled	4 hrs /n.d.
12	Pittsburgh Paints Pitt-Tech 90-374 Interior/Exterior High Performance, High Gloss Industrial Enamel	250	36.7 +/- 2	200	Prepare surface	Durable; chalk/ humidity resistant	70-90 @ 60 deg	n.a/ n.d.
13	Pittsburgh Paints Pitt-Tech 90-474 Interior/Exterior High Performance, Satin Industrial Enamel	250	38.4 +/- 2	200	Prepare surface	Excellent abrasion resistance; not heat resistant	20-25 @ 60 deg	n/a / n.d.
14	PRI Asphalt Technologies Epoxyguard Asphalt Epoxy (2 comp)	221 (ASTM 03960)	50	88	Good	Good abrasion resistance	Good chemical resistance	n.a./n.d

TABLE E-11 (CONCLUDED)

Industrial Maintenance Coatings - from 250 g/l to 100 g/l (20 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
15	Sherwin Williams B66-100 High Gloss DTM Acrylic	208	38 +/- 2	155-250	>500 psi*	Abrasion resistance, 107 mg loss	70+/- 5 @ 60°	n.a./ 3 yrs
16	Sherwin Williams B66-200 Series Semi Gloss DTM Acrylic	208	38 +/- 2	155-250	>500 psi*	Abrasion resistance, 107 mg loss	35 +/- 5 @ 60°	n.a./n.d
17	Sherwin Williams Tank Clad HS Epoxy (B62-80 Series) (2 comp)	177 (249 thinned)	80+/-2	160-255	1000 psi*	Abrasion resistance, 120 mg loss; excellent immersion, impact resistance 20 in./ lbs	Semigloss	2 hrs /n.d
18	Tnemec H.S. Epoxy #104 (2 comp)	158-177 (239 thinned)	82+/-2	131-329	Prepare surface	Superior abrasion, stain resistance; non-immersion/ immersion	Semi-gloss	2 hr / 1 yr
19	Tnemec Cryl SG Series 6 &7	169-258	43+/-2	230-345	Prepare surface	Good protection	Matte (6) Semi-gloss (7)	n/a / 1 yr
20	Vista Paint 4900 Duraprime	n.d.	39	350-450	Prepare surface	Corrosion resistant	Flat	n.a. / n.d.
	Average Summary of Samples	**202**	**58**	**239**				**5.7 / 1.2**

*ASTM D4541 Test Method

⚐ ASTM D2246 Test Method

⅄ ASTM D3359-78 Test Method

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-12

Industrial Maintenance Coatings - 100 g/l or less (33 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
1	Advanced Polymer Sciences Siloxirane 2032 (2 comp)	108	89.6	96 (12 mil)	2,850 psi*	Excellent chemical resistance	Sunlight resistant	2 hrs / 1+ yr
2	Advanced Polymer Sciences Siloxirane 2431 (2 comp)	102	91	70 (20-22 mil) high build	Excellent	Abrasion resistance: 2 mg loss/1000 cycles	UV resistance 40+ yrs.	8 hrs / 1 yr
3	Advanced Polymer Sciences Siloxirane 2432 (2 comp)	102	91	70 (22 mil) high build	Excellent	Abrasion resistance:3.8 mg loss/1,000 cycles	Abrasion resistant	2 hrs / 1 yr
4	Ameron Amercoat® 300 Epoxy (2 comp)	0	44+/-3	353	Good	Good abrasion resistance	Gloss varies	45 mins / 6 months
5	Ameron Amercoat® 351 100% Solids Epoxy (2 comp)	0	100	201	1200* psi	Abrasion resistance, 41 mg loss	Semigloss	1 hr / 1 yr
6	Ameron Amercoat® 395 High Solids Epoxy – Tank Lining (2 comp)	108	91 +/- 3	345-486	Prepare steel	--	Matte	10 hrs / 1 yr
7	Ameron Amercoat® 428PC 100% Solids Epoxy (2 comp)	0	100	267 133.7 (12 mil) high build	Prepare steel, concrete, aluminum	Good abrasion, chemical corrosion resistance	Gloss	½ hr / 1 yr
8	Ameron Dimetcote® 21-5 Inorganic Zinc Silicate Primer (2 comp)	0	62.8	336	1000* psi	Abrasion resistance, 40 mg loss	Flat	8 hrs / 1 yr
9	Ameron Nu-Klad 105A Epoxy Primer and Sealer (2 comp)	0	100	250-400	Prepare concrete	-	Subject to color change	1 hr / 6 months
10	Coatings Resource Corp. CR-26 Solvent Resistant Epoxy Tank Lining (2 comp)	0	100	150 (10 mil) high build	Prepare surface	Excellent; Immersion service	High gloss	30 mins / n.d.

TABLE E-12 (CONTINUED)

Industrial Maintenance Coatings - 100 g/l or less (33 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
11	Coatings Resource Corp. CR-27 High Build Flexible Tank Lining (2 comp)	0	100	150 (10 mil) high build	Prepare surface	Abrasion, chemical resistant	High gloss	1 hr /n.d.
12	Coatings Resource Corp. CR-28 Food Grade Novolac Lining (2 comp)	3-100 (thinned)	100	n.d.	Prepare surface	Corrosion resistant	No gloss	45 mins / n.d.
13	Coatings Resource Corp. CR-31 High Solids Waterborne Clear Gloss Urethane (2 comp)	0	80	n.d.	Prepare surface (marginally prepared steel) Excellent adhesion	Weather resistant	High gloss	2 hr / n.d.
14	Coatings Resource Corp. CR-33 Low Gloss Clear Polyurethane Finish (2 comp)	36-48	62	n.d.	Prepare surface (marginally prepared) Excellent adhesion	Weather, chemical rsistant; color stable	Low to semi 22°-50° @ 60°	2 hr / n.d.
15	Coatings Resource Corp. CR-36 Solventless Gloss Epoxy Finish (2 comp)	0	100	n.d	Prepare surface	Corrosion resistant, non-immersion	90 @ 60 deg	1 hr /n.d.
16	Coatings Resource Corp. CR-42 Epoxy Primer/Sealer (2 comp)	0	100	n.d.	Carbon steel or concrete/ masonry	Water, chemical resistant, immersion	Gloss medium	45 mins / n.d.
17	Coatings Resource Corp. CR-57 (High-Gloss Acrylic)	48-90	42	150-400 180 (3 mil)	Excellent	UV resistant	75-80 @ 60 deg	n/a / n.d.
18	Coatings Resource Corp. CR-58 (Semi-Gloss Acrylic)	48-90	42	180 (3 mil)	Excellent	UV resistant	45-50 @ 60 deg	n/a / n.d.
19	Coatings Resource Corp. CR-59 (Low-Gloss Acrylic)	48-92	42	180 (3 mil)	Excellent	UV resistant	10-30 @ 60 deg	n/a / n.d.

TABLE E-12 (CONTINUED)

Industrial Maintenance Coatings - 100 g/l or less (33 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
20	Glass Shield EP-Guard WB 1590 Epoxy Primer (2 comp)	93	44 +/- 2%	704 (1 mil)	Excellent	-	High gloss	6 hrs / 1 yr
21	DuPont Imron 230ZV Water-Reducible Polyurethane Enamel (2 comp)	0	59-77	617 (2 mil)	Excellent	Excellent resistance: weather, chemical, abrasion, mechanical abuse, salt spary, flexibility.	>90 @ 60° Excellent gloss & color retention	3 hr / 9 mon
22	Glass Shield Floor Guard 100 Polyurethane 100% Solids (2 comp)	0	100	535 1604 (1 mil)	Excellent	Excellent	High gloss	30 mins / 2 yrs
23	Harris Specialty Thorolastic Elastomeric Acrylic	80	56 +/-2%	n.d.	Excellent	Low temp flexibility, waterproof to rain	varies	.n.a. / 1 yr
24	Harris Specialty Thorosheen Acrylic	96	38 +/-2%	n.d.	Excellent	Good abrasion resistance	Excellent	n.a. / 1 yr
25	Harris Specialty Thoro Block Filler Acrylic	n.d.	n.d.	35-100	Good	Good abrasion resistance	8 hrs, rain; no cracking	n/a / 1 yr
26	Hart Polymers HP 210 Acrylic Urethane DTM Primer (single comp)	0	50	n.d.	Excellent	Abrasion resistance, <25 mg loss	Good chemical resistance	n.a. / n.d.
27	Hart Polymers HP 220 Polyurethane Epoxy DTM Primer (single comp)	0	50	n.d.	Excellent	Abrasion resistance, <25 mg	Good chemical resistance	n.a. / n.d.
28	MAB Ply Mastic Epoxy Coating	90	90+/-2	250 (5-7 mil)	450-500 psi	Abrasion resistance, 75-87 mg* loss	Semi-gloss	n.a. / n.d.
29	PolyQuik Spray Polyurea 100% Solids	0	100	1600 Theoretical	350 psi (concrete)	Abrasion resistance, 180 mg loss	Corrosion, chemical resistant	n.a. / 1 yr

TABLE E-12 (CONCLUDED)

Industrial Maintenance Coatings - 100 g/l or less (33 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Gloss Characteristics	Pot Life @70 deg./ Shelf Life
30	Sherwin Williams Armorseal 650 SL/RC 100% Solids Self-Leveling Epoxy (2 comp)	0	100	50-160	Provides nonslip texture	Abrasion, impact, chemical resistant	Full gloss	40 mins / 18 months
31	Sherwin Williams Centurion Water Based Urethane (2 comp)	66	47-58 +/- 2%	310-460 (2-3 mil)	800 psi	Excellent weather, chemical, abrasion resistance	High Gloss	2 hr / 1 yr
32	Sherwin Williams Tower-Guard HS (B54AZ600)	70	89+/-2	145-240	-	Corrosion resistant, excellent exterior	Low lustre	n/a / n.d.
33	United Coatings Elastuff 504 Abrasion Resistant Polyurethane Rubber Coating (2 comp)	n.d.	43+/-2	100 theoretical @6.8 mil (31-100 mil recommended)	4,400 psi	Abrasion resistance 35-40 mg loss ✪	Color will dissipate with UV exposure	1 hr / 1 yr
	Average Summary of Samples	**39**	**76**	**307**				**2.5 / 1.0**

⌘ ASTM D2197 Test Method

*ASTM D4541 Test Method

∇ ASTM D4145-90 Test Method.

⅄ ASTM D3359-78 Test Method

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-13

Non-flats - from 250 g/l to 150 g/l (13 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Benjamin Moore Impervex Latex High Gloss Metal and Wood Enamel #309	<250	34	400-500	-	12 hrs	n/a / -
2	Benjamin Moore Regal Semi-Gloss Aquaglo #333	<380	34	400-450	Washable and scrubable	12 hrs	n/a / -
3	Benajmin Moore Iron Clad Metal & Wood Enamel #363	<250	34	300-400	Tough durable film	6-8 hrs	n/a / -
4	Dunn Edwards Perma Sheen Acrylic Semi-Gloss Enamel W 901	215	34	350-375	-	2-4 hrs	n/a / -
5	Dunn Edwards DECOGLO ® Acrylic Semi-Gloss W 450	240	37	300-400	Excellent durability	4-6 hrs	n/a /-
6	Dunn Edwards DECOSHEEN® Acrylic Eggshell Enamel W 440	215	40	350-400	Durable and washable	8 hrs	n/a /-
7	Dunn Edwards Permagloss Acrylic Gloss Enamel W 960	220	33	350-375	-	2-4 hrs	n/a /1 yr
8	Frazee Paint Production Gloss Enamel II #347	<250	-	400	-	12 hrs	n/a /-
9	Frazee Paint Velglo II Interior Satin Gloss Enamel #328	<250	-	450-550	Superb durability	18 hrs	n/a /-
10	Sherwin Williams ProMar 200 Interior Latex Gloss Enamel	155-195	38+/-2	400	-	4 hrs	n/a / -
11	Sherwin Williams ProClassic Waterborne Acrylic Semi-Gloss	157	35+/-2	400	-	4 hrs	n/a / -
12	Sherwin Williams ProClassic Waterborne Acrylic Gloss (B-21)	157	38+/-2	400	-	4 hrs	n/a / -
13	Sherwin Williams EverClean Interior Satin (A97)	186-220	40+/-2	400	>80% reflectance after at 100 cycles of cleanser	4 hrs	n/a / -
	Average Summary of Samples	**197.8**	**36.1**	**398**		**7.4 hrs**	**n/a / 1 yr-**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-14

Non-flats - from 150 g/l to 50 g/l (11 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Dunn Edwards Enduracryl Low Sheen Finish W 705	135	40	350-400	-	2-4 hrs	n/a / -
2	ICI Dulux Ultra-Hide Build-Dur Spray Latex Eggshell Interior 1472	77	35 +/- 1	200	-	4-8 hrs	n/a / 1 yr
3	ICI/Dulux Exterior Latex Satin Finish 2403	105	36	300-400	-	2-4 hrs	n/a / 1 yr
4	ICI/Dulux Ultra Hide Durus Exterior Acrylic Semi-Gloss Finish 2416	79	41	300-400	-	4 hrs	n/a / 1 yr
5	ICI/Dulux Ultra-Hide Buildtex Interior/Exterior Acrylic Latex 3230	88	54	40-80	-	Overnight	n/a / 1 yr
6	Pittsburgh Paints Brilliant Reflections 51-line Interior/Exterior Latex Gloss Enamel	117-135	38.3 +/- 2	400-450	Washable with soap and water	4 hrs	n/a / -
7	Sherwin Williams SuperPaint Exterior High Gloss Latex Enamel (A85)	105-130	43+/-2	400	-	24 hrs	n/a / -
8	Sherwin Williams A-100 Line – Satin	90-115	33 +/- 2	400	-	4 hrs	n/a / -
9	Sherwin Williams A-100 Line – Gloss	133-157	33 +/- 2	400	-	24 hrs	n/a / 1yr
10	Sherwin Williams LowTemp 35 Exterior Satin House Paint (B17)	101	35+/-2	400	-	5 hrs	n/a / -
11	Sherwin Williams ProMar 400 Interior Latex Egg-Shel Enamel B20W400	121	29+/-2	400	-	24 hrs	n/a / -
	Average Summary of Samples	**108.8**	**37.9**	**342**		**10.1 hrs**	**n/a / 1 yrs**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-15

Non-flats - 50 g/l and less (12 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Scrubability	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Con-Lux Enviro-Plex Acrylic Latex Eggshell Enamel-12000	0	48-50	395-525	-	-	n/a / -
2	Con-Lux Enviro-Plex Acrylic Latex Semi-Gloss Enamel –11000	0	46-48	375-500	-	-	n/a / -
3	Con-Lux Enviro-Plex 100% Acrylic Gloss Enamel-13000	0	50-52	410-545	-	-	n/a / -
4	Dunn Edwards Sierra Interior Acrylic Eggshell Enamel W 540	0	38	350-400	Excellent scrub resist. vs. other zero VOC finishes	2-4 hrs	n/a /-
5	Dunn Edwards Sierra Interior Acrylic Semi-gloss W 550	0	38	350-400	Same as above coating	2-4 hrs	n/a / -
6	Griggs Paint, Acrylic Emulsion (single comp Satin, Semi-gloss and gloss)	0	36-40	435	Extremely abrasion resistant and washable	2-4 hrs	n/a / -
7	ICI Dulux Lifemaster 2000 Interior (Semi-gloss)	0	39	400	Excellent washability	6–8 hrs	n/a / 1 yr
8	ICI/Dulux 2000 (Interior eggshell)	0	40	400	Excellent washability	4 hrs	n/a / 1 yr
9	ICI/Dulux Exterior Acrylic Low Sheen 2403-0500	50	32	400	-	12-16 hrs	n/a / 1 yr
10	ICI/Dulux Decra Shield DS88XX Satin Finish	0	37	300-400	-	2-3 hrs	n/a / -
11	Sherwin Williams Healthspec Low Odor Interior Eg-Shel and Semi-Gloss	0	38-39	400	Withstand 1600-2000 scrub cycles	4 hrs	n/a / -
12	Spectra-Tone Paint Enviro Interior Semi-gloss (9900) and Eggshell Enamel	0	33	-	Washable /excellent durability	4 hrs	n/a / -
	Average Summary of Samples	**4.2**	**40.0**	**410**		**4.9 hrs**	**n/a / 1 yr**

TABLE E-16

Quick-Dry Enamels - from 400 g/l to 250 g/l (3 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Gloss Level on a 60^o Meter	Drying time to touch	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Dunn Edwards Rancho Quick Dry Alkyd Gloss Enamel QD60	400	50	400-425	85-90	1-2 hrs	6-8 hrs	n/a / -
2	Frazee Paint Classic II Quick Dry Exterior Gloss House and Trim Paint #352	<400	-	400-500	85	1-2 hrs	12 hrs	n/a / -
3	Evr-Gard 6900 Elast-A-Trim Gloss House and Trim Enamel - Quick Dry Exterior-Interior Alkyd Enamel	<400	50.9	400	85	2 hrs	24 hrs	n/a/ -
	Average Summary of Samples	**400**	**50.5**	**420.8**			**14.3 hrs**	**n/a / -**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-17

Quick-Dry Enamels - from 250 g/l to 0 g/l (8 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Gloss Level on a 60^o Meter	Drying time to touch	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Dunn Edwards Permagloss Acrylic Gloss Enamel W960	220	33	350-375	80-85	0.5 hr.	2-4 hrs.	n/a / -
2	Evr-Gard 8000 Evr-Gloss Enamel 100% Acrylic High Gloss Enamel	226	47	350-450	High gloss	1 hr.	8 hrs.	n/a / -
3	Flex Bon Premium Interior-Exterior Gloss Acrylic Latex Enamel	185	-	375	75 +/- 5	2-4 hrs.	8 hrs.	n/a / -
4	ICI Dulux – Dulux Interior/Exterior Acrylic Gloss Finish	237	40	300-400	80 minimum	0.5-1 hr.	2-4 hrs.	n/a / 1 yr.
5	Kelly Moore 1260 Arcy-Lustre Acrylic Gloss Enamel	240	31	350-400	70+	1 hr.	Overnight	n/a / -
6	Kelly Moore 1659 Acrylic Latex Gloss Enamel	<250	30	300-400	80+	2 hrs.	Overnight	n/a / -
7	Kelly Moore 1780 Kel-Guard Acrylic Gloss Enamel	249	33	300-400	80 minimum	2 hrs.	Overnight	n/a / -
8	Sherwin Williams ProClassic Waterborne Acrylic Gloss (B21 Series)	157	38	400	70	1 hr.	4 hrs.	n/a / -
	Average Summary of Samples	**216.3**	**36.0**	**370.3**			**5.2 hrs**	**n/a / 1 yr**

note: VOC values that were specified as less than a certain amount (e.g.,”<250”) were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-18

Primer, Sealer, Undercoater - from 350 g/l to 200 g/l (16 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Aquarius Coatings Armabrite 4241	309	67	500	Excellent	Resistant to solvent, chemicals, abrasion, graffiti, etc	4 hrs.	n/a / 1 yr
2	Benjamin Moore Super Spec Alkyd Exterior Primer 176	350	56	500	Excellent	Stain resistant	Overnight	n/a / 1 yr
3	Dunn Edwards ALKYLSEAL® Interior Alkyd Pigmented Sealer E 28-1	350	56	400-450	Good; clean, dry surfaces	Good enamel holdout	24 hrs	n/a / 1 yr
4	Dunn Edwards COMPO Exterior Alkyd Primer/Undercoater 42-1	350	56	400-450	Apply to clean, dry surface	Excellent enamel holdout	> 24 hrs	n/a / 1 yr
5	Dunn Edwards SUPER-LOC® Two Component Waterborne Epoxy Masonry Primer W 718	310	42	150-350	Superior	Alkali/ efflorescence resistant	6-8 hrs	6-8 hrs / 1 yr
6	Dunn Edwards SUPER U-365 Interior Alkyd Enamel Undercoater E 22-1	350	55	400-450	Excellent	Excellent enamel holdout	24 hrs	n/a / 1 yr
7	Frazee Paint Acry-Prime Interior Acrylic Undercoater	250	65.5	350-400	Excellent; clean surface	Blocking resistant	4 hrs	n/a / 1 yr
8	Frazee Paint FRAFLO II Interior Enamel Undercoater	350	84.2	450	Prime clean, dry surfaces	Provides perfect foundation	Overnight	n/a 1 yr
9	ICI Dulux Ultra-Hide Alkyd Prime-N-Finish 1310	347	55	400	Prime the surface	Durable finish	16 hrs	n/a / 1 yr
10	Morton International MorKote™ 1043 Primer (Formula 924-41D)	267	23.2	124	Excellent	Excellent stain resistance	90 min	n/a / 1 yr
11	Pittsburgh Paints Speedhide 6-6 Quick-Drying Enamel Undercoater	349	56 +/- 2	450-500	No special surface prep	Not rust inhibitive	24 hrs	n/a / 3 yrs
12	Pittsburgh Paints Speedhide 6-9 Exterior Wood Primer	334	57.6 +/- 2	400	Avoid direct sunlight	Not for use as topcoat	24 hrs	n/a / 3 yrs

TABLE E-18 (CONCLUDED)

Primer, Sealer, Undercoater - from 350 g/l to 200 g/l (16 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Drying time to recoat	Pot Life @70 deg./ Shelf Life
13	Pittsburgh Paints Speedhide 6-209, Galvanized Steel Primer	346	55.6 +/- 2	420-460	No special surface preparation	Good resistance to corrosion	24 hrs	n/a / 3 yrs
14	Vista Paint 088 Enamel Undercoat	350	57.5	300-400	Clean surfaces	Excellent sanding qualities	12 hrs	n/a / 1 yr
15	Vista Paint 1100 Hi Build Sealer	250	29	250-350	Apply to clean, dry surfaces	Excellent enamel holdout	2-3 hrs	n/a / 1 yr
16	Vista Paint 4100 Prime Kote	340	53	350-450	Excellent; clean surfaces	Uniform enamel holdout	24 hrs	n/a / 1 yr
	Average Summary of Samples	**325**	**54.3**	**390**			**15 hrs**	**7 hrs / 1.4 yrs**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-19

Primer, Sealer, Undercoater - from 200 g/l to 100 g/l (7 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Glass Shield PrimeTar MC 46750	206	76 +- 2%	408	Excellent	Excellent	4 hrs	6 hr / 1 yr
2	Glass Shield Floor Guard WB 590	193	46 +- 2%	251	Excellent	Excellent	3 hrs	6 hrs / 1 yr
3	ICI Ultra-Hide Durus Exterior Acrylic Primecoat 2010-1200	143	32 +/- 1	400	Excellent	Moisture resistance	3-6 hrs	n/a / 1 yr
4	Morton International MorKote™ 1300 primer (Formula 997-68)	158	34.8	186	Good flow & leveling	Excellent blocking resistance	2 hrs.	n/a / 1 yr
5	Pittsburgh Paints Speedhide 6-755 Waterbase Interior/ Exterior Undercoater	204	34.2 +/- 2	400	Apply on bare wood	Not for exterior use	2 hrs	n/a / 5 yrs
6	Pittsburgh Paints SunCare 2-510 – Exterior Latex Wood Primer	124	39 +/- 2	400	Dampen surface in hot dry weather	Mildew resistant	4-6 hrs	n/a / 5 yrs
7	Sherwin Williams Loxon Exterior Acrylic Masonry Primer (A24)	130	40	200	154 psi	Pass*	24 hrs	n/a / 1 yrs
	Average Summary of Samples	**165.4**	**43.1**	**320**			**6.4 hrs**	**6 hrs / 2.1 yrs**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-20

Primer, Sealer, Undercoater - 100 g/l and less (12 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Dunn Edwards M-P PRIME Acrylic Multi-purpose Primer W 713	85	38	400	Excellent	Adheres well	4 hrs	n/a / 1 yr
2	Dunn Edwards VINYLASTIC® Interior Pigmented Sealer W101	60	37	300-400	Excellent	Excellent enamel holdout	2-4 hrs	n/a / 1yr
3	Evans/ Gibson-Homans Primer 01018	90	43	600	Apply to clean, dry surface	Excellent water resistance	2 hrs	2 hrs / 1 yr
4	Hart Polymers HP-200 (2-comp acrylic epoxy)	0	50	400	Pass*	Abrasion resistance 50 mg loss	3-5 hrs	2.5-3 hrs / 1 yr
5	Morton International MorKote™ 1300 sealer (Formula924-143A)	8.62	36	400-500	Good flow & leveling	Excellent block resistance	30 min	n/a / 6 months
6	Pittsburgh Paints 17-13 Exterior Hardboard Primer/Sealer	109	38.7 +/- 2	350-400	No special surface preparation	Blocking resistance	24 hrs	n/a / 5 yrs
7	Pittsburgh Paints Speedcraft 5-2 Interior Latex Primer-Sealer, White	83	24.6 +/- 2	350-450	Apply on primed surfaces	Not intended for high heat/ strong chemicals	4 hrs	n/a / 5 yrs
8	Pittsburgh Paints Speedhide 6-2 Quick-Drying Interior Latex Primer-Sealer	96	28.4 +/- 2	350-450	No special surface prep	Not resistant to high alkalinity	4 hrs	n/a / 5 yrs
9	Pittsburgh Paints Speedhide 6-609 Exterior Latex Wood Primer	89	39 +/- 2	400	No special surface preparation	Blister and mildew resistant	4-6 hrs	n/a / 5 yrs
10	Pittsburgh Paints Weatherfresh 73-1 Latex Wood Primer	89	39 +/- 2	400	Brush wood	Blister and mildew resistant	4-6 hrs	n/a / 5 yrs
11	Sherwin Williams PrepRite 400	63	29 +/- 2	400	Good quality	Good quality	4 hrs	n/a / 1 yr
12	Sherwin Williams PrepRite 200	85	28 +/- 2	400	Professional best line	Professional best line	4 hrs	n/a / 1 yr
	Average Summary of Samples	**71.5**	**35.9**	**415**			**5.3 hrs**	**2.4 hrs / 2.6 yrs**

* Test method ASTM D2197

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-21

Quick-Dry Primer, Sealer, Undercoater - from Exempt to 200 g/l (2 samples)

(Numerous coatings listed in Primer, Sealer, Undercoater meet the dry time requirements of a Quick-Dry PSU)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Drying time to touch	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Pittsburgh Paints Rez 77-30 Interior Quick-Drying Sealer and Finish	560	26.6 +/- 2	500-700	No special surface prep.	30 mins	2-3 hrs	n/a / 3 yrs
2	Pittsburgh Paints Speedhide 6-10 Quick-Drying Interior Sanding Wood Sealer/Finish	560	27.3 +/- 2	500-700	Sand lightly	30 mins	2-3 hrs	n/a / 3 yrs
	Average Summary of Samples	**560**	**27.0**	**600**			**2.5 hrs**	**n/a / 3 yrs**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-22

Quick-Dry Primer, Sealer, Undercoater - from 200 g/l to 100 g/l (2 samples)

(Numerous coatings listed in Primer, Sealer, Undercoater meet the dry time requirements of a Quick-Dry PSU)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Drying time to touch	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Dunn Edwards UNIKOTE Interior Acrylic Enamel Undercoater W 707	130	43	400-450	Good: clean, dry surfaces	30 mins	2 hrs	n/a / 1 yr
2	Insl-X Aqualock Waterbase primer, sealer, stain killer (AQ 0500)	118	43	345	Excellent$^{\nabla}$	20-30 mins	1 hr	n/a / 1 yr
	Average Summary of Samples	**124**	**43**	**385**			**1.5 hrs**	**n/a / 1 yr**

∇ Test method ASTM D3359

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-23

Quick-Dry Primer, Sealer, Undercoater - 100 g/l and less (8 samples)

(Numerous coatings listed in Primer, Sealer, Undercoater meet the dry time requirements of a Quick-Dry PSU)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Drying time to touch	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Dunn Edwards Sierra Interior Sealer/Undercoater W500	0	38	300-400	Good; prime surface	30 mins	2 hrs	n/a / 1 yr
2	Dunn Edwards EFF-STOP® Acrylic Masonry Primer/Sealer W 709	105	34	200-400	Apply to clean, dry surfaces	30 mins	2-4 hrs	na / 1 yr
3	ICI Dulux Ultra-Hide Acrylic Primer 1020-1200	108	31 +/- 1	450	Excellent	30 mins	2 hrs	n/a / 1 yr
4	ICI Dulux Latex Wall Primer 1000-1200	103	29	300-400	Excellent	30 mins	2 hrs	n/a / 1 yr
5	ICI Dulux Ultrahide Primer, Sealer	96	41	400	Excellent	30 mins	2 hrs	n/a / 1 yr
6	ICI Dulux Ultrahide Vapor Barrier Latex Primer/Sealer	85	34	400	Excellent	30-60 mins	2 hrs	n/a / 1 yr
7	ICI Dulux Lifemaster 2000 Interior Primer/Sealer	0	32	400	Excellent	30-60 mins	2-3 hrs	n/a / 1 yr
8	Shieldz Universal Pre-wall covering primer	75	75	400	Good	15 mins	2 hrs	n/a / 1 yr
	Average Summary of Samples	**71.5**	**39.3**	**381**			**2.2 hrs**	**n/a / 1 yr**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-24

Water Proofing Sealers (Wood and Concrete) - from 400 g/l to 250 g/l (21 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @ ~3 mil	Adhesion / penetration into substrate	Durability Qualities	Resistance to H_20 /UV exposure	Pot Life @70 deg./ Shelf Life
1	Consolideck Saltguard©	<400	n/a	100-200	Deep penetration	Moisture, chemical resistant	Water repellent	n/a
2	Consolideck SX©	<400	n/a	80-200	Deep penetration	Salt, chemical, acid, oil resistant	Water repellent	n/a

TABLE E-24 (CONTINUED)

Water Proofing Sealers (Wood and Concrete) - from 400 g/l to 250 g/l (21 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @ ~3 mil	Adhesion / penetration into substrate	Durability Qualities	Resistance to H_20 /UV exposure	Pot Life @70 deg./ Shelf Life
3	Hydrozo Enviroseal 20	320	n/a	125-200	.14	Chemical resistant	Water resistant	n/a
4	Hydrozo Enviroseal 40	340	n/a	125-200	.24	Chemical resistant	Water resistant	n/a
5	Hydrozo Enviroseal Surface Guard	<350	n/a	125-200	.063-.125	Excellent	Water resistant	n/a
6	Sherwin Williams Cuprinol Clear Deck	287	6.4 +/- 2	200-300	Pressure treated	Water repellent	Water repellant	n/a / 1 yr
7	Sure Klean CC-1060 Weather Seal	271.9	n/a	80-125	Good	Moisture, leaching, mildew resistant	Water repellent	n/a
8	Sure Klean CC-1125 Weather Seal Siloxane	350	n/a	80-125	Good	Moisture, leaching, mildew resistant	Water repellent	n/a
9	Sure Klean Heavy Duty Weather Seal©	<400	n/a	n/a	Good	Moisture, leaching, mildew resistant	Water repellent	n/a
10	Sure Klean T-1010 Weather Seal Siloxan©	<400	n/a	175-300	Good	Moisture, leaching, mildew resistant	Water repellent	n/a
11	Sure Klean Weather Seal H40©	<400	n/a	60-200	Deep penetration	Moisture, leaching, mildew resistant	Water repellent	n/a
12	Sure Klean Weather Seal Siloxane©	<400	n/a	100-200	Deep penetration	Moisture, leaching, mildew resistant	Water repellent	n/a
13	Tex-Cote Rainstopper Series 100	400	8	50-125	Apply to clean surface	Water resistant 2500 hrs exposure	Excellent after 250 hrs of UV	n/a / 1 yr
14	Tex-Cote Rainstopper Series 200	400	20	100-125	Apply to clean surface	Water resistant 2500 hrs exposure	Excellent after 250 hrs of UV	n/a / 1 yr
15	Tex-Cote Rainstopper Series 400, 500	400	25	100-200	Apply to clean surface	Water resistant 2500 hrs exposure	Excellent after 250 hrs of UV	n/a / 1 yr
16	Tex Cote Rainstopper Series 1750W	<400	82.5-89	100-125	.1" depth	Water resistant	Water resistant	n/a / 1 yr

TABLE E-24 (CONCLUDED)

Water Proofing Sealers (Wood and Concrete) - from 400 g/l to 250 g/l (21 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @ ~3 mil	Adhesion / penetration into substrate	Durability Qualities	Resistance to H_20 /UV exposure	Pot Life @70 deg./ Shelf Life
17	Thompson's Water Seal Waterproofing Formula#171	400	10	50-400	Dry, clean surface	Excellent resistant to abrasion	Excellent water repellency	n/a / 1 yr
18	Wacker Masonry Water Repellent BS 591	393	56.39	125	Excellent	Alkai resistant	Water repellent	n/a/ / 1 yr
19	Weather Seal Siloxane WB Concentrate	318	100	600-4000	Good	n/a	Water repellent	n/a / 1 yr
20	ZAR Stain & Sealer (UGL) Tint Base	350**	n/a	n/a	n/a	n/a	Water repellent	n/a
21	Zehrung Zerepel WB Acrylic Water Sealer	345	9	75-250	Good	Mildew, oxidation resistant	Water, UV resistant	n/a / stable
	Average Summary of Samples	**352**	**35.6**	**264.3**				**n/a / 1 yr**

** Obtained from product label

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-25

Water Proofing Sealers (Wood and Concrete) - 250 g/l and less (31 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @ ~3 mil	Adhesion / penetration into substrate	Durability Qualities	Resistance to H_20 /UV exposure	Pot Life @70 deg./ Shelf Life
1	Behr Plus 10 Masonry & Stucco Paint	149-166	31-33	400	Exceptional	n/a	24 hrs	n/a
2	Benjamin Moore & Co. Moorlastic Acrylic Elastomeric Waterproof Coating- Flat 056	<250	38.6	160-200	Apply to clean, dry surface	Excellent durability	Resistant to rain	n/a
3	Benjamin Moore & Co. Moorlastic Acrylic Elastomeric Waterproof Coating- Low Lustre 055	<250	38.6	60-80	Apply to clean, dry surface	Excellent durability	Resistant to rain	n/a
4	Consolideck SX WB	<200	n/a	75-500	Deep penetration	Deicing salt, salt air resistant	Water repellent	n/a
5	Ducksback Water Repellant Clear (Master Chem Ind.)	250**	n/a	n/a	n/a	n/a	Water repellent	n/a
6	Dutch Boy Aqua Shield Water Proofing Sealer	115**	n/a	n/a	n/a	n/a	Water repellent	n/a

TABLE E-25 (CONTINUED)

Water Proofing Sealers (Wood and Concrete) - 250 g/l and less (31 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @ ~3 mil	Adhesion / penetration into substrate	Durability Qualities	Resistance to H_20 /UV exposure	Pot Life @70 deg./ Shelf Life
7	Flood Company Seasonite Woodprotector	245		300	n/a	n/a	Water repellent	n/a
8	Hart Polymers HP-110 (2-comp water-based, aliphatic epoxy)	0	55	250-500	Excellent adhesion	n/a	Resists discoloring, water	4 hrs / 1 yr
9	Hart Polymers HP-150 (2 comp aliphatic epoxy elastomeric)	0	62	250-350	Excellent adhesion	Tensile strength 2000 psi	Excellent UV resistance	1.5-2 hrs / 1 yr
10	Hart Polymers HP-340 (single comp aliphatic polyurethane elastomeric – heavy applications - roofs)	0	58-61	33	Excellent adhesion	Tensile strength 1500 psi	20 in./lbs. impact resistance	n/a / 1 yr
11	Hart Polymers HP-350 (2- comp acrylic epoxy)	0	61	250-350	Pass *	Tensile strength 5000 psi	50 in./lbs impact resistance	1.5-2 hrs / 1 yr
12	Okon® Water-based water proofing concrete sealers W1 & W2	210	5 (W1) 10 (W2)	100-300	Apply with brush, roller or spray.	Excellent resistance to abrasion	Excellent resistance to UV	n/a / 1 yr
13	Pittsburgh Paints Aquapon WB 98-Line Waterborne Epoxy High Performance	230	38 +/- 2	203	Apply to dry, clean primed surface	Impact, abrasion resistant	Stain resistance	6 hrs / 5 yrs
14	Pittsburgh Paints Coal Cat 97-640, 641 Coal Tar Epoxy Coating	234	72.3 +/- 2	165-192	Apply to dry, clean primed surface	Very good / excellent chemical resistance	Fresh and salt water resistant	8-10 hrs / 8 months
15	Resene Flexicover E High Build Elastomeric Membrane	10	n/a	32	Apply to dry, clean surface	Excellent	Water repellent	Indefinite/ Indefinite
16	Resene Thixalon 5 High Build Barrier Membrane	46	n/a	11	Apply to dry, clean surface	Excellent	Water repellent	Indefinite/ Indefinite
17	Resene X-200 Acrylic Waterproofing Membrane	89	n/a	54-81	Apply to dry, clean surface	Excellent	Water repellent	Indefinite/ Indefinite
18	SaverSystems MasonrySaver 20B	142	20 +/- .5	90-300	Water repellent	n/a	5 mins wet recoat	n/a/ 18-24 months
19	SaverSystems MasonrySaver WB	51	6 +/- .5	90-300	Water repellent	n/a	5 mins wet recoat	n/a/ 18-24 months
20	SaverSystems MasonrySaver for Block	78	21.5 +/- .5	40-125	Water Repellent	n/a	5 mins wet recoat	n/a/ 18 months
21	Seal Krete® Waterproofing Sealer	<8	10	80-300	Excellent	High	Excellent	n/a / 2 years
22	Sherwin Williams ConSeal Elastomeric Sealants	51	n/a	n/a	Apply to clean surface	Good durability	Weatherproof	n/a

TABLE E-25 (CONCLUDED)

Water Proofing Sealers (Wood and Concrete) - 250 g/l and less (31 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @ ~3 mil	Adhesion / penetration into substrate	Durability Qualities	Resistance to H_20 /UV exposure	Pot Life @70 deg./ Shelf Life
23	Sherwin Williams Elastomeric Waterproofing Coating A5 Series	55	48 +/- 2	160	Apply to clean, dry, patched surface	Tensile strength 135 psi	Weather resistant	n/a
24	Sherwin Williams H&C Block Shield Masonry Waterproofer	173	41 +/- 2	75-150	Apply to clean, dry surface	Good durability	Water presure resistant	n/a
25	Sherwin Williams H&C Concrete & Masonry Waterproofing Sealer	114	9 +/- 2	100-250	Penetrates surfaces	Weather resistant	Weather resistant	n/a
26	Sherwin Williams H&C WB-50 Water Based Water Repellent	0	5 +/- 2	25-200	Apply to clean, dry surface	Water repellent	Water repellent, permeable to water vapor	n/a
27	Standoff Penetrating Water Repellent WB	0	n/a	75-250	Deep penetration	Soil, stain resistant	Water repellent	n/a
28	Sure Klean CC-1024 Weather Seal	0	n/a	80-250	Apply to clean, dry surface	Water repellent	Water repellent	n/a
29	Sure Klean Custom Concrete Deck Sealer	<200	n/a	n/a	Deep penetration	Deicing salts, salt air resistant	Water repellent	n/a
30	PHENOSEAL® Liquid Waterproofing	97	9	n/a	Deep penetration	Extends surface life of wood	Water repellent, maintains colors	n/a
31	Weather Seal Siloxane PD	<200	7	75-500	Deep penetration	Water repellent	Water repellent	n/a
	Average Summary of Samples	**93.9**	**32.1**	**184**				**4.5 / 1.6 yr**

* Test method ASTM D2197
** Obtained from product label
note: VOC values that were specified as less than a certain amount (e.g.,”<250”) were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-26

Stains - from 350 g/l to 250 g/l (12 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion / penetration into substrate	Resistance to UV exposure	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Ace Redwood Stain Latex	350	n/a	n/a	n/a	n/a	n/a	n/a
2	Behr Deck Plus Semi-Transparent Deck, Fence & Siding Stain	276-279	17-18	250-300	Good penetration	n/a	Not Recommended	n/a
3	Cabot Bleaching Oil 6241	<350	62.2-67.4	150-600	Water repellant	n/a	24-48 hrs	n/a/ >10 yrs
4	Cabot Clear Solution 9100	<350	54.6-54.8	150-500	Water repellant	n/a	24-48 hrs	n/a/ >10 yrs
5	Cabot O.V.T. Color Oil Stains 6500 Series	350	58.1	150-500	Water repellant	n/a	24-48 hrs	n/a/ >10 yrs
6	Cabot Semi-Solid Stains 6100 series	<350	57.0-57.2	150-600	Water repellent, penetrates	n/a	24-48 hrs	n/a/ >10 yrs
7	Cabot Semi-Transparent Stains 6300 series	<350	54.1-55.7	150-600	Water repellent, penetrates	n/a	24-48 hrs	n/a/ >10 yrs
8	Cabot Step Saver	<350	62.4	500	Water repellent, penetrates	n/a	24-48 hrs	n/a/ >10 yrs
9	Pittsburgh Paints 77-315,77-317 Exterior Solid Color Stains	350	55.9 +/- 2	300-600	Excellent water repellant	Good for long term exposures	24 hrs	n/a / 3 yrs
10	Pittsburgh Paints 77-360 Exterior Semi-Transparent Stain-Oil	350	55.2 +/- 2	300-600	Excellent water repellant	Good for long term exposures	24 hrs	n/a / 3 yrs
11	SaverSystems Defy Penetrating Water Repellent Wood Finish	333	20	150-300	Excellent water repellent	UV resistant	5-10 mins	n/a/ 18-24 months
12	Sherwin Williams H&C Shield Plus Concrete Stain	256	30 +/- 2	50-300	Resists oil, gasoline, and water	Resists UV rays	2 hrs	n/a/ n/a
	Average Summary of Samples	**323.8**	**48.2**	**354**			**16**	**n/a / 7.5 yrs**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-27

Stains - 250 g/l and less (24 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion / penetration into substrate	Resistance to UV exposure	Drying time to recoat	Pot Life @70 deg./ Shelf Life
1	Benjamin Moore Solid Color Acrylic Exterior Stain 179	250	30	300-450	Excellent hiding, adhesion	Mildew, fading, blistering resistant	3 hr	n/a / 5 yrs
2	Behr Deck Plus Solid Color Deck, Fence & Siding Stain	159-184	32-37	400	Excellent	n/a	24 hrs	n/a
3	Behr No. 9 Oil/Latex Redwood Stain	156	21-23	400	Resists cracking, peeling	n/a	4 hrs	n/a
4	Behr Plus 10 Concrete Stain	188-193	27-30	500	n/a	n/a	24 hrs	n/a
5	Behr Plus 10 Semi-Transparent Oil/Latex Stain	210-225	23-24	350	Superior	n/a	8 hrs	n/a
6	Behr Plus 10 Solid Color Oil/Latex Stain	110-116	35-37	200-400	Superior	n/a	6-8 hrs	n/a
7	Blue River Wood Stain	60	13	n/a	Excellent	n/a	n/a	n/a / 1+ yrs
8	EVR-GARD A2000 Solid Color Acrylic Stain	156	40	150-300	Excellent hiding, adhesion	Mildew, fading, blistering resistant	2-4 hrs	n/a / 5 yrs
9	Flood Semi-Transparent Deck and Siding Stain	250	n/a	250-400	Good	n/a	n/a	n/a
10	Flood Solid Deck & Siding Stain	250**	n/a	n/a	n/a	n/a	n/a	n/a
11	ICI Dulux Woodpride Exterior Waterborne Semi-Transparent Stain	148	24 +/- 1	200-400	Good	Good	n/a	n/a / 1 yr
12	ICI Dulux Woodpride Exterior Waterborne Solid Color Stain	139	28 +/- 1	250-450	Good	Good	4 hrs	n/a / 1 yr
13	Okon® Natural Choice Wood Toner	220	15	50-250	Good	Excellent	8-24 hrs	n/a Indefinite
14	Okon® Semi-Transparent Deck Stain	171	15	100-250	Excellent	Excellent	4-12 hrs	n/a Indefinite
15	Pittsburg Paints Rez 77-400 Solid Color Acrylic Latex Stains	132	24 +/- 2	150-300	n/a	n/a	2-4 hrs	n/a
16	Pittsburgh Paints Rez 77-445 Solid Color Acrylic Latex Stains Exterior/Interior	142	24 +/- 2	150-300	Must back-roll for max penetration	Excellent color retention	2-4 hrs	n/a / 5 yrs
17	Pittsburgh Paints Rez 77-460 Exterior Semi-Transparent Latex Stain	174	18.3 +/- 2	200-500	Must back-roll for max penetration	Excellent color retention; mildew/ crack resist.	2-4 hrs	n/a / 5 yrs

TABLE E-27 (CONCLUDED)

Stains - 250 g/l and less (24 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion / penetration into substrate	Resistance to UV exposure	Drying time to recoat	Pot Life @70 deg./ Shelf Life
18	Pittsburgh Paints Speedhide 6-7415 & 7417 Professional Exterior Solid Color Latex Stains	138-154	23.3 +/- 2	200-400	Must back-roll for max penetration	Good long term fade resistance	2-4 hrs	n/a / 5 yrs
19	Resene Waterborne Woodsman Penetrating Semi-Transparent Oil Stain	85	n/a	122-570	n/a	n/a	24 hrs	Indefinite/ Indefinite
20	Rhinoguard Semi-Transparent Deck and Siding Finish	0	30	550	Excellent	Excellent UV resistance	24 hrs	n/a / 5 yrs
21	Sherwin Williams Cuprinol Solid Color Deck Stain	199	40 +/- 2	300-500	Excellent	n/a	24 hrs	n/a
22	Sherwin Williams ProMar Exterior Solid Color Acrylic Latex Stain A16 Series	110	32 +/- 2	200-400	n/a	Non-photo-chemically reactive	4 hrs	n/a
23	Sherwin Williams WoodScrapes House Stain Exterior Acrylic Solid Color A15 Series	137	33 +/- 2	200-400	n/a	n/a	5 hrs	n/a
24	Vianova RESYDROL® (AY586) Semi-Transparent	0	45	241	Good	Will not crack, peel or chip	8 hrs	n/a / 5 yrs
	Average Summary of Samples	**150.7**	**27.6**	**322**			**10.1**	**n/a / 3.8**

** Obtained from product label

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-28

Rust Preventative Coatings - from 350 g/l to 100 g/l (5 samples)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Pot Life @70 deg./ Shelf Life
1	Dunn Edwards BLOC-RUST® Red Oxide Alkyd Corrosion Inhibitive Primer 43-4	300	64	500-550	Prepare surface	Corrosion resistant	n.a. / n.d.
2	Dunn Edwards Corrobar White Alkyd Corrosion Inhibitive Primer 43-5	345	56	500-550	Prepare surface. Excellent adhesion	Corrosion resistant	n.a. / n.d
3	Pittsburgh Paints Speedhide 6-208 Rust Inhibitive Steel Primer	n.d.	52.2 +/- 2	390-535	Prepare surface	Rust inhibitive properties	n/a / n.d.
4	Pittsburgh Paints Speedhide 6- 212 Rust Inhibitive Steel Primer	n.d	52.2 +/- 2	390-535	Prepare surface	Rust inhibitive properties	n.a. / n.d.
5	EVR-GARD 908 Rust Inhibitive Metal Primer	320	59.0	Approx. 400	Prepare surface	Rust inhibitive properties	n.a. / n.d.
	Average Summary of Samples	**321.7**	**56.7**	**475**			**n/a / -**

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

TABLE E-29

Rust Preventative Coatings - 100 g/l and less (1 sample)

#	Coating Company and Product Name	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Adhesion Qualities	Durability Qualities	Pot Life @70 deg./ Shelf Life
1	Pittsburgh Paints Speedhide 6-712 Waterbase Inhibitive Metal Primer	n.d.	41.9 +/- 2	300-350 (2 mil)	Prepare surface, excellent adhesion	Corrosion inhibitive properties	n.a. / n.d.
	Average Summary of Samples	**-**	**41.9**	**325**			**n/a / -**

* ASTM D2197 test method

note: VOC values that were specified as less than a certain amount (e.g.,"<250") were not used to calculate the average VOC content. The mid-point of those values given as a range was used to calculate the average.

APPENDIX F

RISK ASSESSMENT METHODOLOGY

METHODOLOGIES FOR RISK ASSESSMENT

The following presents the methodologies the SCAQMD used to estimate the toxic risks associated with the implementation of PAR 1113. The reader referred to the attached spreadsheets for the variables and assumptions used in these methodologies. The reader is also referred to the SCAQMD's Risk Assessment Procedures for Rules 1401 and 212 (November 1998) for a more detailed discussion of risk assessment procedures.

Health risk assessment is used to estimate the likelihood that an individual would contract cancer or experience other adverse health effects as a result of exposure to toxic air contaminants. Risk assessment is a methodology for estimating the probability or likelihood that an adverse health effect will occur. The risk assessment procedures for PAR 1401 are consistent with current recommendations by Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA). OEHHA is the state agency with primary responsibility for developing and recommending risk assessment methods

Carcinogenic Analysis

The equation for calculating MICR is:

$$\mathrm{MICR} = \mathrm{Qyr} \times \mathrm{U} \times \left(\frac{\mathrm{X}}{\mathrm{Q}}\right) \times \mathrm{MET} \times \mathrm{MP} \times \mathrm{LEA}$$

$$\mathrm{Qyr} = \text{Amount of Toxic Emissions, } \frac{\text{tons}}{\text{yr}}$$

$$\mathrm{U} = \text{Toxic Unit Risk Factor, } \left(\frac{m\mathrm{g}}{\mathrm{m}^3}\right)^{-1}$$

$$\left(\frac{\mathrm{X}}{\mathrm{Q}}\right) = \text{Dispersion Factor, } \left(\frac{m\mathrm{g}}{\mathrm{m}^3} \Big/ \frac{\text{tons}}{\text{yr}}\right)$$

$$\mathrm{MET} = \text{Metrological Correction Factor}$$

$$\mathrm{MP} = \text{Multi - Pathway Adjustment Factor}$$

$$\mathrm{LEA} = \text{Life Time Exposure Adjustment Factor}$$

Knowing that the SCAQMD significance threshold for toxics is MICR $>10\mathrm{x}10^{-6}$, the following equation is used to estimate the yearly toxic emissions that would have to be emitted to exceed this threshold.

$$\mathrm{Qyr} = \frac{\mathrm{MICR}}{\mathrm{U} \times \left(\frac{\mathrm{X}}{\mathrm{Q}}\right) \times \mathrm{MET} \times \mathrm{MP} \times \mathrm{LEA}}$$

To calculate the amount of daily toxic emissions that would have to be emitted to exceed a MICR $>10\text{x}10^{-6}$, the following equation is used.

$$\text{Qday}, \frac{\text{lbs}}{\text{day}} = \frac{\text{Qyr}}{\text{Days}} \times \frac{2000\,\text{lbs}}{\text{ton}}$$

$$\text{Qyr} = \text{Amount of Toxic Emissions}, \frac{\text{tons}}{\text{yr}}$$

$$\text{Days} = \text{Coating Application}, \frac{\text{days}}{\text{yr}}$$

Knowing the daily toxic emissions, the daily coating usage necessary to exceed a MICR $>10\text{x}10^{-6}$ can be estimated using the following equation.

$$\text{Usage}, \frac{\text{gal}}{\text{day}} = \frac{\text{Qday}}{\text{Density} \times \left(\frac{\%\text{Tox}}{100}\right)}$$

$$\text{Qday} = \text{Amount of Toxic Emissions}, \frac{\text{lbs}}{\text{day}}$$

$$\text{Density} = \text{Density of Coating}, \frac{\text{lbs}}{\text{gal}}$$

$$\%\text{Tox} = \text{Percentage of Toxic Compound in Coating}, \%$$

Chronic Analysis

The equation for calculating HIC is:

$$\text{HIC} = \frac{\text{Qyr} \times \left(\frac{\text{X}}{\text{Q}}\right) \times \text{MET} \times \text{MP}}{\text{REL}}$$

$$\text{Qyr} = \text{Amount of Toxic Emissions}, \frac{\text{tons}}{\text{yr}}$$

$$\left(\frac{\text{X}}{\text{Q}}\right) = \text{Dispersion Factor}, \left(\frac{mg}{\text{m}^3} \Big/ \frac{\text{tons}}{\text{yr}}\right)$$

$$\text{MET} = \text{Metrological Correction Factor}$$

$$\text{MP} = \text{Multi - Pathway Adjustment Factor}$$

$$\text{REL} = \text{Reference Expsoure Level}$$

Knowing that the SCAQMD significance threshold for toxics is HI >1, the following equation is used to estimate the yearly toxic emissions that would have to be emitted to exceed this threshold.

$$\text{Qyr} = \frac{\text{HIC} \times \text{REL}}{\left(\frac{\text{X}}{\text{Q}}\right) \times \text{MET} \times \text{MP}}$$

To calculate the amount of daily toxic emissions that would have to be emitted to exceed a HI >1, the following equation is used.

$$\text{Qday}, \frac{\text{lbs}}{\text{day}} = \frac{\text{Qyr}}{\text{Days}} \times \frac{2000\ \text{lbs}}{\text{ton}}$$

$$\text{Qyr} = \text{Amount of Toxic Emitted}, \frac{\text{tons}}{\text{yr}}$$

$$\text{Days} = \text{Coating Application}, \frac{\text{days}}{\text{yr}}$$

Knowing the daily toxic emissions, the daily coating usage necessary to exceed a HI >1 can be estimated using the following equation.

$$\text{Usage}, \frac{\text{gal}}{\text{day}} = \frac{\text{Qday}}{\text{Density} \times \left(\frac{\%\text{Tox}}{100}\right)}$$

$$\text{Qday} = \text{Amount of Toxics Emitted}, \frac{\text{lbs}}{\text{day}}$$

$$\text{Density} = \text{Density of Coating}, \frac{\text{lbs}}{\text{gal}}$$

$$\%\text{Tox} = \text{Percentage of Toxic Compound in Coating}, \%$$

Acute Analysis

The equation for calculating HIA is:

$$\mathrm{HIC} = \frac{\mathrm{Qhr} \times \left(\frac{\mathrm{X}}{\mathrm{Q}}\right)_{\max}}{\mathrm{REL}}$$

$$\mathrm{Qhr} = \text{Amount of Toxic Emitted}, \frac{\mathrm{lbs}}{\mathrm{hr}}$$

$$\left(\frac{\mathrm{X}}{\mathrm{Q}}\right)_{\max} = \text{Dispersion Factor}, \left(\frac{mg}{\mathrm{m}^3} \Big/ \frac{\mathrm{tons}}{\mathrm{yr}} \right)$$

$$\mathrm{REL} = \text{Re ference Expsoure Level}$$

Knowing that the SCAQMD significance threshold for toxics is HI > 1, the following equation is used to estimate the hourly toxic emissions that would have to be emitted to exceed this threshold.

$$\mathrm{Qhr} = \frac{\mathrm{HI} \times \mathrm{REL}}{\left(\frac{\mathrm{X}}{\mathrm{Q}}\right)_{\max}}$$

Knowing the hourly toxic emissions, the daily coating usage necessary to exceed a HIA > 1 can be estimated using the following equation.

$$\text{Usage}, \frac{\mathrm{gal}}{\mathrm{day}} = \frac{\mathrm{Qhr} \times \mathrm{Hours}}{\mathrm{Density} \times \left(\frac{\%\mathrm{Tox}}{100}\right)}$$

$$\mathrm{Qhr} = \text{Amount of Toxic}, \frac{\mathrm{lbs}}{\mathrm{hrs}}$$

$$\mathrm{Hours} = \text{Coating Application}, \frac{\mathrm{hrs}}{\mathrm{day}}$$

$$\mathrm{Density} = \text{Density of Coating}, \frac{\mathrm{lbs}}{\mathrm{gal}}$$

$$\%\mathrm{Tox} = \text{Percentage of Toxic Compound in Coating}, \%$$

Toxic Analysis for PAR 1113

(Amount of Coatings That Can Be Used before SCAQMD Significance Thresholds are Exceed)

"Real-Case" Analysis

Compound	% by wt.	Unit Risk Factor 1/(ug/m3)	Chronic REL ug/m3	Acute REL ug/m3	MICR MP	Chronic MP	Target Organs
Toluene	10		2.00E+02	4.00E+04		1	CNS/PNS, Repr
Xylene	10		3.00E+02	2.20E+04		1	Repr, Resp
Methyl Ethyl Ketone*	10		1.00E+03	1.30E+04		1	Repr
Isopropyl Alcohol*	10		2.00E+03	3.00E+03		1	CV/BL, CNS/PNS, Immun
Ethylene Glycol*	10		4.00E+02			1	Resp, Skin, Kidn, Repr
Propylene*	10		3.00E+03			1	Resp
Glycol Ethers & Acetates	10		2.00E+01	1.40E+04		1	Resp
EGBE	10		2.00E+01	1.50E+03		1	CV/BL
EGEE	10		2.00E+02	3.70E+02		1	Repr, CV/BL
EGME	10		2.00E+01	9.30E+01		1	Repr
Toluene Diisocyanate	*1*	1.10E-05	9.50E-02		1	1	Resp
Hexamethylene Diisocyanate*	*1*		1.00E-02			1	Resp
Isocyanate	*1*		9.50E-02			1	Resp

Assumptions

Coating	Density	10.5	lbs/gal
	hrs/day	8	
	days/yr	260	
	Stack Ht	Ground Level	
	Receptor	Residential	
	Location	West LA	
Signficance Threshold for	MICR	1.00E-06	
Signficance Threshold for	HIC	1	
Signficance Threshold for	HIA	1	

Input Variables

Distance to Receptor m	X/Q ug/m3 / tons/yr	X/Qmax ug/m3 / lb/hr	MET	LEA
25	51.18	2000	1.00	1
50	16.88	1000.6	1.00	1
100	4.51	373.5	1.00	1

Carcinogenic Analysis (MICR)

		25m			50m			100m	
Compound	**QYR** tons/yr	**QDAY** lbs/day	**Usage** gals/day	**QYR** tons/yr	**QDAY** lbs/day	**Usage** gals/day	**QYR** tons/yr	**QDAY** lbs/day	**Usage** gals/day
Toluene Diisocyanate	0.00	0.01	0.13	0.01	0.04	0.39	0.02	0.16	1.48

Chonic Exposure Analysis (HIC)

		25m			50m			100m	
Compound	**QYR** tons/yr	**QDAY** lbs/day	**Usage** gals/day	**QYR** tons/yr	**QDAY** lbs/day	**Usage** gals/day	**QYR** tons/yr	**QDAY** lbs/day	**Usage** gals/day
Toluene	3.9078	30.060	28.628	11.848	91.141	86.801	44.346	341.122	324.878
Xylene	5.8617	45.090	42.943	17.773	136.712	130.202	66.519	511.683	487.318

Toxic Analysis for PAR 1113

(Amount of Coatings That Can Be Used before SCAQMD Significance Thresholds are Exceed)

Methyl Ethyl Ketone	19.5389	150.299	143.142	59.242	455.705	434.005	221.729	1705.611	1624.392
Isopropyl Alcohol	39.0778	300.598	286.284	118.483	911.411	868.010	443.459	3411.223	3248.784
Ethylene Glycol	7.8156	60.120	57.257	23.697	182.282	173.602	88.692	682.245	649.757
Propylene Glycol+A13	58.6166	450.897	429.426	177.725	1367.116	1302.016	665.188	5116.834	4873.176
Glycol Ethers & Acetates	0.3908	3.006	2.863	1.185	9.114	8.680	4.435	34.112	32.488
EGBE	0.3908	3.006	2.863	1.185	9.114	8.680	4.435	34.112	32.488
EGEE	3.9078	30.060	28.628	11.848	91.141	86.801	44.346	341.122	324.878
EGME	0.3908	3.006	2.863	1.185	9.114	8.680	4.435	34.112	32.488
Toluene Diisocyanate	0.0019	0.014	0.136	0.006	0.043	0.412	0.021	0.162	1.543
Hexamethylene Diisocyanate*	0.0002	0.002	0.014	0.001	0.005	0.043	0.002	0.017	0.162
Isocyanate	0.0019	0.014	0.136	0.006	0.043	0.412	0.021	0.162	1.543

Acute Exposure Analysis (HIA)

	25m		**50m**		**100m**	
Compound	**QHR**	**Usage**	**QHR**	**Usage**	**QHR**	**Usage**
	lbs/hr	gals/day	lbs/hr	gals/day	lbs/hr	gals/day
Toluene	20.00	152.38	39.98	304.58	107.10	815.96
Xylene	11.00	83.81	21.99	167.52	58.90	448.78
Methyl Ethyl Ketone	6.50	49.52	12.99	98.99	34.81	265.19
Isopropyl Alcohol	1.50	11.43	3.00	22.84	8.03	61.20
Glycol Ethers & Acetates	7.00	53.33	13.99	106.60	37.48	285.59
EGBE	0.75	5.71	1.50	11.42	4.02	30.60
EGEE	0.19	1.41	0.37	2.82	0.99	7.55
EGME	0.05	0.35	0.09	0.71	0.25	1.90

*Proposed OEHHA Values

APPENDIX G

1994 OZONE SIP COMMITMENTS FOR VOC REDUCTIONS FROM ARCHITECTURAL COATINGS MEASURES

TABLE A
1994 OZONE SIP COMMITMENTS FOR VOC EMISSION REDUCTIONS FROM ARCHITECTURAL COATING MEASURES (TPD)

Non-attainment Area		1990	1999	2002	2005	2010
South Coast Air Basin	Baseline	67.2	71.3	74.3	77.6	83.0
	Reductions	--	0.0	27.5	40.5	62.3
	% Control	--	--	37%	52%	75%
Ventura County	Baseline	5.0	5.5	5.8	6.1	
	Reductions	--	0.0	0.0	0.9	
	% Control	--	--	--	15%	
Sacramento Metro (Placer County and Yolo-Solano only)	Baseline	11.6	14.8	16.0	17.2	
	Reductions	--	0.9	1.3	1.6	
	% Control	--	6%	8%	9%	
San Joaquin Valley	Baseline	19.5	21.2			
	Reductions	--	1.5			
	% Control	--	7%			

TABLE B
RECENT PLAN AMENDMENT COMMITMENTS FOR VOC EMISSION REDUCTIONS FROM ARCHITECTURAL COATING MEASURES (TPD)

Non-attainment Area		1990	1999	2002	2005	2010
South Coast Air Basin (1997 AQMP)	Baseline	65.9	69.5	72.0	74.7	79.4
	Reductions	--	3.3	18.2	20.3	39.3
	% Control	--	5%	25%	27%	49%
Ventura County (1997 amendment)	Baseline	5.0	5.5	5.8	6.1	
	Reductions	--	0.0	0.7	0.9	
	% Control	--	--	12%	15%	

APPENDIX H

CAPCOA SUMMARY OF AIR DISTRICTS' SIGNIFICANCE CRITERIA

Note: This appendix is new to the Final Program EIR.

THRESHOLDS OF SIGNIFICANCE - OPERATIONAL EMISSIONS (LB/DAY) (1)

District	ROG	NO_x	PM_{10}	CO	Odor	Toxics	Cumulative
Amador							
Area Source (per acre)	34	17	6.4	485.1			
Line Source	550	347.9	130.5				
Combustion Point Source	550	365.4	137				
Non-combustion Pt. Source	24.2	none	7.3				
BAAQMD	80	80	80	550 or affects LOS or traffic volumes	Screening Table	Carcinogens-10 in 1 million Non-carinogen - > than 1 for MEI	Individual projects > thresholds. Projects below levels-consistency with GP & AQP.
Butte Co. APCD							
Level A (standard MMs)	≤25	≤25	≤80				
Level B (supplemental MMs)	>25	>25	>80				
Level C (supplemental MMs)	>137	>137	>137				
Calaveras Co. APCD*	550	—	—				
Colusa Co.APCD	25	25	80				
El Dorado Co. APCD*	10	10	80				
Feather River AQMD	25	25	80				
Glenn County APCD	25	25	80	550			
Great Basin Unified APCD	none	none	none			Cancer risk >10 in 1 million	
Kern County APCD	137	137	—			Health risk public levels	Consistency with AQP
Lake County APCD	—	—	—				
Lassen County APCD*	25	—	—				
Mariposa County APCD	—	—	—				
Mendocino County APCD*	220	220	80				
Modoc County	—	—	—				
Mojave Desert AQMD*	137	137	82				
Monterey Bay Unified APCD	150	150	82	550 or affects LOS or traffic volumes triggering modeling		Rule 1000 Thresholds	Consistency with AQMP

District	ROG	NO_x	PM_{10}	CO	Odor	Toxics	Cumulative
North Coast Unified APCD*	220	—	—				
Northern Sierra AQMD	137	137	137				
Northern Sonoma APCD*	220	—	—				
Placer County APCD	82	82	82	82			Individual projects above threshold; consistency with pop. forecasts in AQP
Sacramento Metro. AQMD	85	85	275				Projects requiring a land use change with increased emissions over existing land use
San Diego County APCD	none	none	none				
San Joaquin Valley UAQMD	10 t/y	10 t/y	None Meet Reg. VII	Modeling	Screening Table	Increases cancer risk with maximum exposure by 10 in 1 million. Non-cancer Hazard Index >1	
San Luis Obispo Co. APCD Tier 1 (On-site MMs) Tier 2 (All feasible MMs)	 10-24 ≥25	 10-24 ≥25	 10-24 ≥25	550 modeling required			
Santa Barbara Co. APCD All project sources Mobile sources only	 240 25	 240 25	 80 25				Consistency with AQP and AQ Supplment of Co. GP
Shasta Co. AQMD	25	25	80				
Siskiyou Co. AQMD	—	—	—				
South Coast AQMD	55	55	150 or 2.5 ug/m$_3$ - 24-hr	550 or 1.1 mg/m^3 = 1.0 ppm (1-hr. average)	Creates an objectionable odor > 10 D/T	MICR≥10 in 1 million HI≥ 1.0 (project increment) HI≥ 5.0 (facilitywide)	
Tehama Co. APCD*	137	137	137				
Tuolumne Co. APCD	100 t/y	100 t/y	—				
Ventura Co. APCD Ojai Valley Rest of County	 5 25	 5 25	—				Projects with emissions >2 lbs/day- consistency w/ AQMP. GP Amend - consist w/ AQMP
Yolo-Solano AQMD	82	82	82	550			

(1) Thresholds were provided to MBUAPCD by districts unless indicated by a *. These (*) thresholds are from a Draft Survey prepared by Sacramento Metropolitan AQMD. October 1998.

APPENDIX I

COMMENTS ON THE DRAFT PROGRAM EIR AND RESPONSES TO COMMENTS

Note: This appendix is new to the Final Program EIR.

COMMENTS ON THE DRAFT PROGRAM EIR

Valspar
1191 Wheeling Rd. / Wheeling, IL 60090
847/541-9000
FAX: 847/541-7549

February 14, 2000

Jim Nyarady
California EPA
Air Resources Board
Stationary Source Division
2020 L Street
Sacramento, Ca. 95814

Dear Jim,

Sorry I missed the conference call on Friday - I did not receive notice of the conference call number until it was too late. I am sending you below some comments on the cost survey that I sent in two weeks ago, and some exposure data that follows up on the data I supplied to you last summer.

1-1 First the cost survey comments. The cost survey I sent shows what Valspar has allocated to R&D efforts to achieve low VOC in the categories supplied. It by no means implies that we can achieve the desired VOC and maintain performance for every quality in every category, it just shows we have dedicated resources to try to do it. The numbers reported total to 44% of my R&D budget. As has been my concern all along, we can make low cost, low quality products that meet the 2002 standards, but we cannot maintain performance in higher quality products that the consumer expects to perform. We get few complaints on low quality paints because consumers don't expect much, but the expectations on higher quality paints ($15 to $25 per gallon price) is much greater.

1-2 Averaging does not appear an option for us because we have a high proportion of our business is high end product, and the amount we can "bank" on low end paint is not enough to make up for what we need on the high end.

1-3 A specific example is the exposure results attached. The paints shown here are the same ones I reported results on last some to you - interior / exterior gloss enamel on the chart titled "Valspar Exterior CARB Data 6.2.99". The bottom three products were put on exposure at the time they were made. The attached photographs show that the low VOC formulations are failing for adhesion when the normal VOC formula is not. The failures are typical of paints that are under-coalesced and have poor film formation. The test substrates painted in these cases are re-paint surfaces that would be a common substrate for gloss paints.

1-3 I also must reiterate my comments from last summer on the resin choices available for low VOC exterior products. There is only one supplier who claims to have a resin suitable for low VOC paints (Rohm & Haas SF-3122). Rohm & Haas will tell you that this resin should be limited to white or light colored flat paints. This is because the resin has poor tint retention properties and higher sheen paints will pick up dirt quickly because it is too soft. We have confirmed these claims. There is no other option for glossy exterior paints that have the proper performance.

I will continue to provide data as it is acquired.

Very truly yours,

Paul S Sara

Paul S. Sara
Technical Director

PSS/blm
Attachments

CC: Donald Ames – Please see Jim's letter for attachments.
Naveen Berry

Valspar Exterior CARB Data 6.2.99

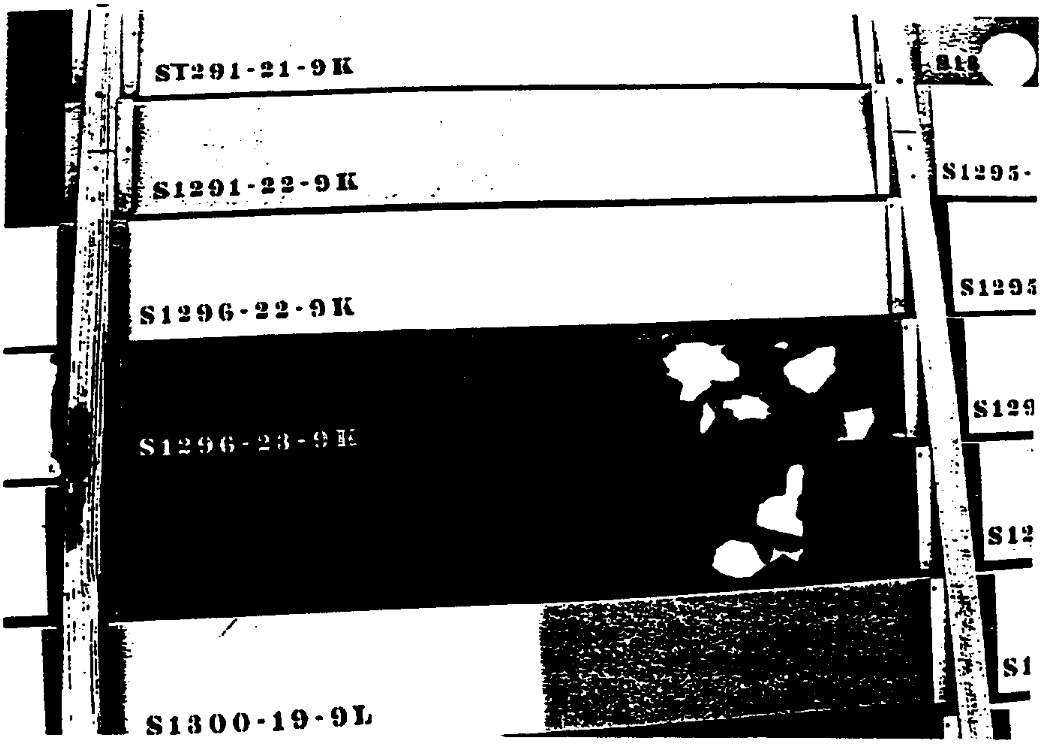
Description	VOC	Scrub		LTC*	Freeze-Thaw	60 Gloss
		Cycles			Cycles	
Acrylic Flat - 1 (Current)	102	270		pass	5	
	50	238	-11%	pass	0	
Acrylic/PVA Flat (Current)	92	326		pass	3	9
	50	258	-21%	pass	0	9
Acrylic Flat - 2 (Current)	140	282		pass	5	
	50	214	-24%	pass	0	
PVA Flat (Current)	96	393		pass	0	
	50	316	-20%	pass	0	
Acrylic Satin (Current)	119	388		pass	5	26
	50	308	-21%	pass	2	20
Acrylic/PVA Satin (Current)	102	125		pass	5	25
	50	100	-20%	pass	3	19
Acrylic Semi-Gloss (Current)	121	439		pass	5	45
	50	334	-24%	pass	3	27
Acrylic/PVA Semi-Gloss (Current)	124	182		pass	5	31
	50	167	-11%	pass	2	32
Int/Ext Gloss Enamel (Current)	203	1559		pass	5	75
(White)	150	1582		pass	5	74
	50	312	-80%	fail	0	73
Int/Ext Gloss Enamel (Current)	248	252		pass	5	71
(Black)	150	210		pass	0	79
	50	105	-58%	fail	0	74
Int/Ext Gloss Enamel (Current)	248	154		pass	5	77
(Red)	150	150		pass	5	77
	50	86	-44%	fail	0	73

* LTC = Low Temperature Coalescence

①

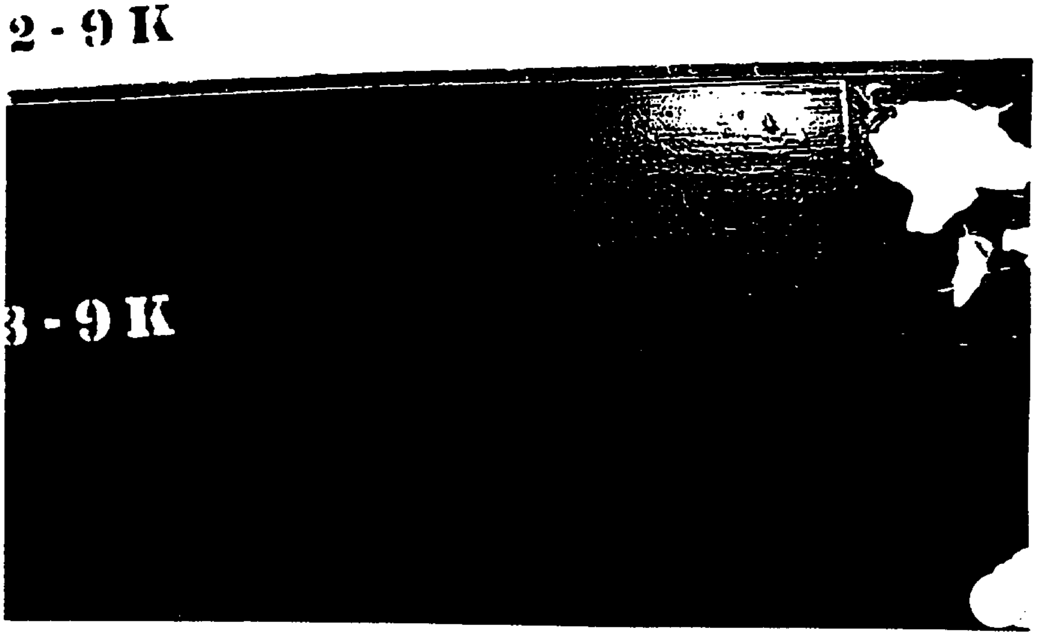
EXPOSURES ON MODERATELY CHALKY SUBSTRATE
9 Months exposure

White, Black and Red Int/Ext. Gloss Paints
LEFT OF PANEL = 248 VOC (211 VOC on white)
MIDDLE = 150 VOC
RIGHT = 50 VOC
BLISTERING AND LOSS OF ADHESION ON LOWER VOC PAINTS.

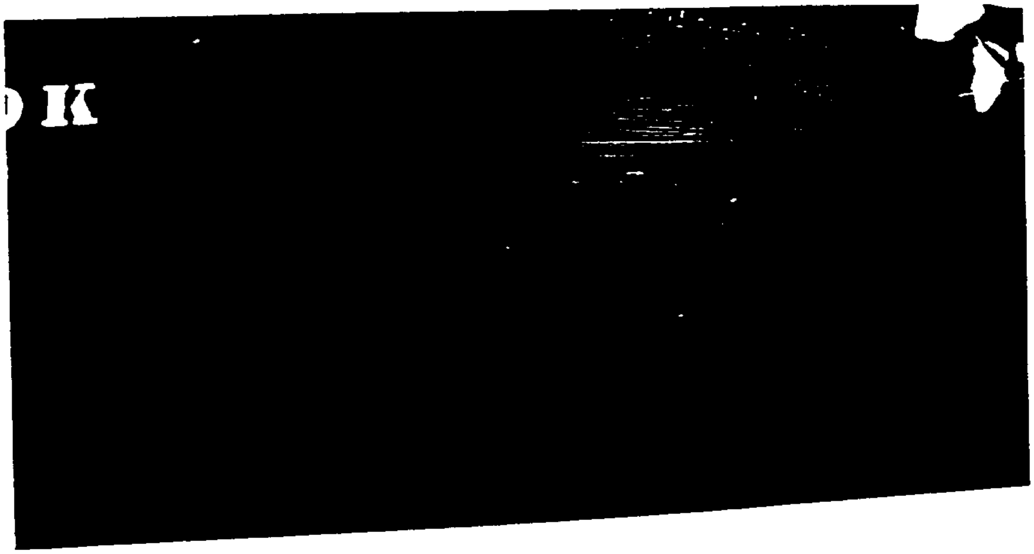


white shows problems but does not show in this close up. – see above photo

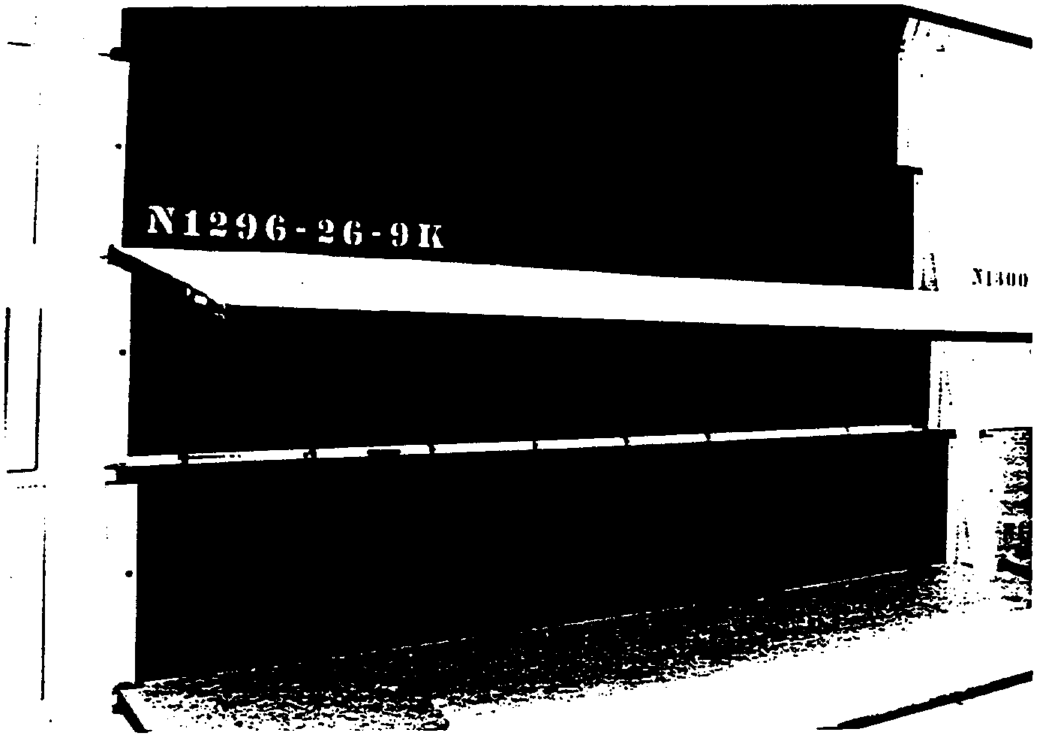
CLOSE-UP OF BLACK PANEL ABOVE, LEFT IS 248 VOC, MIDDLE IS 150 VOC, RIGHT IS 50 VOC.



LOSE-UP OF RED.
EFT = 248 VOC
IDDLE = 150 VOC
IGHT = 50 VOC
OTE BLISTERS AND
D SION LOSS.



UNDER EAVE EXPOSURE



CLOSE-UP OF BLACK PANES. --
248 VOC ON LEFT,
150 VOC IN MIDDLE
50 VOC ON RIGHT.
NOTE BLISTERS AND WRINKLING

Red panel shows the same but does not show on the pictures.

FAXED 2/17/2000
confirmed receipt Kathy Spring

TCA

TEXTURED COATINGS OF AMERICA, INC.

CORPORATE OFFICES & EASTERN PLANT
2422 East 15th Street • Panama City, FL 32405-6348
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WESTERN PLANT
5950 S. Avalon Blvd.
Los Angeles, CA 90003-1384
(323) 233-3111 • FAX: (323) 232-1071

February 17, 2000

VIA E-mail jbrooks@arb.ca.gov and Facsimile (916) 327-6251 (without enclosures)
VIA Federal Express Overnight (with enclosures)

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 "L" Street
Sacramento, CA 95812

RE: Waterproofing Concrete/Masonry Sealer Category

Dear Ms. Brooks:

I am president and CEO of Textured Coatings of America, Inc., (hereinafter "TCA"), a small national paint and coatings manufacturer having factories in California and Florida. TCA specializes in manufacturing high-performance concrete coating systems. TCA is beginning its 40th year in business as a company and has previously faced and had to deal with continued VOC regulations of this industry. I personally attended many of the South Coast's workshops held regarding Rule 1113. TCA's chief chemist, Kevin Worrall, has attended all of your workshops regarding your proposed Suggested Control Measures (hereinafter "SCM"). I also served as a small company representative during the entire regulatory negotiations for the federal AIM Rule.

2a-1 The California Air Resources Board (hereinafter "CARB") has consistently stated that they would follow the South Coast Air Quality Management District's (hereinafter "SCAQMD") Architectural Rule 1113. The most recent draft of the CARB's SCM dated February 11, 2000, indicates the deletion of the Waterproofing Concrete/Masonry Sealer Category. We are having trouble understanding why CARB would unilaterally delete this category since it is a category recognized in the SCAQMD's Architectural Rule 1113.

TCA believes that CARB should reinstate this category which was previously intact in its former draft of the Suggested Control Measures dated December 1, 1999. We believe that substantial justification can be shown why the Waterproofing Concrete/Masonry Sealer Category should remain intact at a VOC level of 400 grams per liter. TCA's concrete protective coating, XL-70® has significant technical justification to be considered in this category which was listed in your previous drafts of SCM's.

These arguments were made to SCAQMD who agreed with our position, and, in fact provided the enclosed letter whereby accepting TCA's XL-70® product line as a Waterproofing Concrete/Masonry Sealer. Also enclosed are TCA's chief chemist's comments relative to his technical justifications of TCA's XL-70® product line falling into the Waterproofing Concrete/Masonry Sealer Category.

2a-1 TCA has repeatedly reformulated its XL-70® product line to its lowest possible VOC limit. To reduce it below a limit of 400 grams per liter would result in the elimination of the entire product line. TCA's XL-70® product line is unique and provides protection and beauty to thousands of concrete structures throughout California. TCA's XL-70® product is a high-performance product, which require virtually no maintenance. Consequently, the total amount of VOC emissions with XL-70® are significantly lower versus the use of other lower-performing products which require repeated coating and maintenance thereby emitting greater VOC levels over time.

2a-2 TCA currently employs 65 people. In addition, there are hundreds of people who make their living selling and apply these products. If the Waterproofing/Concrete Masonry Sealer Category were eliminated, one of the outcomes for TCA would be to close its Los Angeles factory and re-locate it outside of the state of California. This could be economically and socially devastating for many of our employees, some who have been with TCA in excess of 30 years or more and whose livelihoods depend on the operation of this factory.

As TCA's president and CEO, I respectfully request CARB to reconsider its tentative decision to eliminate the Waterproofing/Concrete Masonry Sealer Category. I also request immediate feedback from CARB if it will consider this request to re-open this category so TCA can determine what the next course of action should be to ensure this category and VOC limit remain intact. Please feel free to contact me at (800) 454-0340, extension 248 if you have any questions.

I look forward to your response.

Respectfully,

Jay A. Haines
President/CEO

Enclosures: SCAQMD's May 5, 1999 Correspondence
Kevin Worrall, Chief Chemist for TCA's Comments on XL-70®
(Various testing data reports)

TCA

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FAXED
2/17/2000
Receipt by Kathy Spring

February 17, 2000

Via E-mail jbrooks@arb.ca.gov and Facsimile (916) 327-6251 (without enclosures)
Via Federal Express Overnight (with enclosures)

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Waterproofing Concrete/Masonry Sealer Category

Dear Ms. Brooks,

I would like to introduce myself. My name is Kevin Worrall Chief Chemist for Textured Coatings of America and have been employed as such for over 28 years.

During my tenure, a major product line was developed for water proofing concrete and masonry namely Tex-Cote XL-70® Concrete Protective Coatings. It is my wish to provide you with extensive supporting data relative to Textured Coating of America's XL-70® product line. These products should be classified as ***Water Proofing*** Concrete Masonry Sealers with a maximum V.O.C. of 400 grams per liter.

The formulated design for XL-70® utilizes a chemical system based on a vinyl acrylic toluene copolymer resin in mineral spirits which provides its ability for application directly over old or new damp (green) concrete.

2a-1

In today's market it is being used as a primerless system for concrete Tilt-ups, poured in place concrete, cement masonry, blocks, bricks, and various mineral substrates.

Tex-Cote XL-70® has extensive compatibility with form oils and release agents, which are present as surface residues in formed concrete. Lower V.O.C. products cannot penetrate such residues for adhesion, and are prone to failure such as extensive peeling and color irregularities.

Because Tex-Cote XL-70® is a high build one coat primerless application it will provide an average of 16 mils dry film when applied at our specification of 50 square feet per gallon.

This thick film will protect concrete and similar cement based substrates for 20 years or more from **water penetration**, freezing conditions, abrasion, as well as hide numerous imperfections on formed concrete such as "worm holes or small cracks." It is specified by Department of Transportations, architects and military all over America.

In order to substantiate the uniqueness of Tex-Cote XL-70® Concrete Protective Coating, a survey was conducted by Ron Joseph & Associates Coating Consultants.

Mr. Joseph had interviews conducted with technical staff of P.P.G Industries, Tnemec Co., Ameron Protective Coatings, Carbolone Co, Cook Paint and Varnish, Porter Coatings, & Reliance universal to determine if there existed a low V.O.C. solvent based vinyl type coating with performance properties of Tex-Cote XL-70® Coating.

2a-1 The conclusion was not one of these companies had a concrete protective coating with low V.O.C. having all the properties of Tex-Cote XL-70® Coating.

What is important to realize is that concrete used for bridges, support columns, Tilt-ups, and poured in place construction are all reinforced with steel rebars. In order to protect these rebars from **water penetration**, salt and atmosphere chemical intrusion, it becomes vital to protect the concrete substrate with the appropriate weather proofing system. Tex-Cote XL-70 will provide this protection.

I have repeatedly reformulated the XL-70® product line to its lowest V.O.C. limit possible. To reduce it past a limit of 400 grams per liter would mean the elimination of the entire XL-70® product line.

The above mentioned performance properties are a major function of Tex-Cote XL-70® products and in order to provide supporting data I have included a package of independent laboratory reports as follows:

(1.) Federal specifications TTC 555B – Passes
(2.) 10,136 hours Weatherometer – (This is approximately 28 years)
(3.) Freeze thaw – 378 passes
(4.) Salt spray ASTM B-117 – 3024 Hours no adhesion loss
(5.) Fungus test TTP-29 (21 day incubation) Passed
(6.) Tex-Cote XL-70® Infra Red Spectrum – for identification
(7.) Abrasion test ASTM D968-81 – 2,500 liter sand passed
(8.) Fire test ASTM E84 – Class A NFPA – Passed
(9.) Resistance to 98 miles/hr wind driven rain. TTC 555B – Passed
(10.) Accelerated alkali resistance – Resistance to 5% sodium
Per Federal Specification Hydroxide at 120° F for 16 hours
TTC 555B Exception #1 Passed
(11.) Tex-Cote XL-70® C Bridge Cote® – Passed Federal Specification TTC 555B and
(Concrete Curing Compound AASHTO M 148 and T – 155
Concrete) (Same as ASTM C 156-74)

Be advised that there is another XL-70® Concrete Protective Coating namely – "Tex-Cote XL-70® Bridge Cote® with Silane & XL 70® Roll-on with Silane."

These two products are essentially the same basic formula for Tex-Cote XL-70® but modified with a silane water repellent and provide additional protection.

The test reports listed for these products are as follows:

(1.) XL-70® Roll-on with silane - 400 hrs Weatherometer test per Federal Specification TTC 555B. Passed at 80 and 40 square feet per gallon.
(2.) XL-70® Bridge Cote® with Silane – Fungus test TTP 29 with 21 day incubation. Passed
2a-1 (3.) XL-70® Bridge Cote® with Silane – Permeability – Passed per ASTM E 96.
(4.) XL-70® Bridge Cote® with Silane – Chloride ion penetration AASHTO T-258-80 & ASHTO T 260-84 Passed.
(5.) XL-70® Bridge Cote® with Silane – Salt spray test ASTMB117 300 hrs Passed.
(6.) Xl-70® Bridge Cote® with Silane Scale Resistance – Tested for 50 cycles ASTM C672-91. Passed
(7.) XL-70® Bridge Cote® with Silane Weatherometer – Tested per Federal test TTC 555B for 400 hrs. – Passed
(8.) XL-70® Bridge Cote® with Silane Freeze Thaw – 100 cycles per Mississippi standard specifications (Section 714.12) Passed 100 cycles
(9.) XL-70® Bridge Cote® with Silane – Water absorption test ASTMC642 reduced water penetration in hardened concrete by 50%.
(10.) XL-70® Bridge Cote® Silane – NCHRP 244 series IV accelerated weathering (Southern Climate) reduction of chloride ion penetration. Passed

In conclusion, we believe that the role of Tex-Cote XL–70® for water proofing concrete and masonry is extremely important and should be available to the industry to provide the necessary protection. To help achieve this, a V.O.C. limit of 400 grams per liter must be maintained and we respectfully request that Tex-Cote XL-70® be classified as a water proofing sealer for concrete and masonry.

Thank you,

Kevin Worrall
Chief Chemist
Textured Coatings of America, Inc.

KW/ct

AQMD
South Coast
Air Quality Management District
21865 E. Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • http://www.aqmd.gov

May 5, 1999

Mr. Jay A. Haines
President/CEO
Texture Coating of America, Inc.
Corporate Office & Eastern Plant
2422 East 15th Street
Panama City, Florida 32405-6348

Dear Mr. Haines:

This letter is to provide you with a response regarding the Tex-Cote XL-70® coating and its classification under Rule 1113 – Architectural Coatings.

My staff has reviewed all of the information your company submitted on this coating and has concluded that Tex-Cote XL-70® is classifiable under Rule 1113 as a Waterproofing Concrete/Masonry Sealer. This category has an existing volatile organic compound (VOC) limit of 400 grams per liter (less water and exempt solvent), and is not affected by the amendments to be considered by the South Coast Air Quality Management District's Governing Board on May 14, 1999.

If you have any additional questions regarding this letter, please contact Mr. Naveen Berry at (909) 396-2363.

Sincerely,

Jack P Broadbent

Jack P. Broadbent
Deputy Executive Officer
Planning, Rule Development, and Area Sources

RECEIVED
MAY 11 1999
BY

cc: Naveen Berry
Kevin Worrall, Texture Coatings of America, Inc.

FAXED

TEXTURED COATINGS OF AMERICA, INC.

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April 6, 2000

VIA E-mail jbrooks@arb.ca.gov
VIA Facsimile (916) 327-6251
VIA Federal Express Overnight

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 "L" Street
Sacramento, CA 95812

RE: Concrete Protective Coatings Category

Dear Ms. Brooks:

It was a pleasure speaking to you and your staff by telephone on March 20, 2000. I appreciate the time and consideration you have given to my company's request for the California Air Resources Board (CARB) to adopt the Concrete Protective Coatings Category as specified under the Federal Architectural Industrial Maintenance Coatings Rule. We believe the best and most reasonable decision would be to incorporate the Federal Concrete Protective Category at a VOC of 400 grams per liter in CARB's Suggested Control Measure.

2b-1 I hope CARB realizes the significant contribution Textured Coatings of America, Inc.'s (hereinafter "TCA") XL-70® product line provides in a maintenance-free primer-less coating system to the State of California. We believe we have shown technical justification of our XL-70® product to substantiate this category. In fact, your agency has been provided with independent laboratory testing showing XL-70® products have a longevity in excess of 25 years. Even the South Coast Air Quality Management District has agreed with TCA as shown in their letter we provided to you in our February 17, 2000 correspondence. TCA has repeatedly reformulated its XL-70® product line to its lowest possible VOC limit. To reduce the Waterproofing Sealer Category to 250 grams per liter and not implement the Concrete Protective Coatings Category would be disastrous for both TCA and the State of California. This would mean eliminating a proven high performance primer-less coating system, which is maintenance free; the elimination of TCA's main product line; closing of TCA's West Coast factory; and unemployment of many California residents whose source of livelihood is the sale of TCA's products.

2b-1 As TCA's president and CEO, I respectfully request CARB to implement this category at a VOC of 400 grams per liter. Even though you have said it is not necessary for TCA to supply any further data, testing, etc. on our XL-70® product, we will be glad to comply with any further requests, if necessary. If I can be of any assistance, please feel free to contact me at (800) 454-0340, extension 248.

Respectfully,

Jay A. Haines
President/CEO

JAH/sam

MONTEREY BAY
Unified Air Pollution Control District
serving Monterey, San Benito, and Santa Cruz counties

AIR POLLUTION CONTROL OFFICER
Douglas Quetin

24580 Silver Cloud Court • Monterey, California 93940 • 408/647-9411 • FAX 408/647-8501

February 25, 2000

Jim Nyarady
Manager
Strategy Evaluation Section
Stationary Source Division
P.O. Box 2815
Sacramento, CA 95812

SUBJECT: DEIR FOR SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Dear Mr. Nyarady:

Staff has reviewed the referenced document and has the following comments:

3-1 1. Page IV-60. Reference is made to the significance thresholds of the SCAQMD has being the most conservative. Attached for your information, are thresholds of various districts based on a survey undertaken for the CAPCOA Planning Managers in 1998 which shows several districts with lower thresholds.

3-2 2. ARB staff should be commended for preparing a very thorough and comprehensive environmental document. It will be an invaluable reference for districts subsequently adopting the SCM.

Thank you for the opportunity to review the document. Please do not hesitate to call if you have any questions.

Sincerely,

Janet Brennan

Janet Brennan
Supervising Planner
Planning and Air Monitoring Division

Enc.

THRESHOLDS OF SIGNIFICANCE - OPERATIONAL EMISSIONS (LB/DAY) (1)

District	ROG	NO_x	PM_{10}	CO	Odor	Toxics	Cumulative
Amador							
Area Source (per acre)	34	17	6.4	485.1			
Line Source	550	347.9	130.5				
Combustion Point Source	550	365.4	137				
Non-combustion Pt. Source	24.2	none	7.3				
BAAQMD	80	80	80	550 or affects LOS or traffic volumes	Screening Table	Carcinogens-10 in 1 million Non-carinogen - > than 1 for MEI	Individual projects > thresholds. Projects below levels-consistency with GP & AQP.
Butte Co. APCD							
Level A (standard MMs)	≤25	≤25	≤80				
Level B (supplemental MMs)	>25	>25	>80				
Level C (supplemental MMs)	>137	>137	>137				
Calaveras Co. APCD*	550	—	—				
Colusa Co.APCD	25	25	80				
El Dorado Co. APCD*	10	10	80				
Feather River AQMD	25	25	80				
Glenn County APCD	25	25	80	550			
Great Basin Unified APCD	none	none	none			Cancer risk >10 in 1 million	
Kern County APCD	137	137	—			Health risk public levels	Consistency with AQP
Lake County APCD	—	—	—				
Lassen County APCD*	25	—	—				
Mariposa County APCD	—	—	—				
Mendocino County APCD*	220	220	80				
Modoc County	—	—	—				
Mojave Desert AQMD*	137	137	82				
Monterey Bay Unified APCD	150	150	82	550 or affects LOS or traffic volumes triggering modeling		Rule 1000 Thresholds	Consistency with AQMP

District	ROG	NO$_x$	PM$_{10}$	CO	Odor	Toxics	Cumulative
North Coast Unified APCD*	220	—	—				
Northern Sierra AQMD	137	137	137				
Northern Sonoma APCD*	220	—	—				
Placer County APCD	82	82	82	82			Individual projects above threshold; consistency with pop. forecasts in AQP
Sacramento Metro. AQMD	85	85	275				Projects requiring a land use change with increased emissions over existing land use
San Diego County APCD	none	none	none				
San Joaquin Valley UAQMD	10 t/y	10 t/y	None Meet Reg. VII	Modeling	Screening Table	Increases cancer risk with maximum exposure by 10 in 1 million. Non-cancer Hazard Index >1	
San Luis Obispo Co. APCD Tier 1 (On-site MMs) Tier 2 (All feasible MMs)	 10-24 ≥25	 10-24 ≥25	 10-24 ≥25	550 modeling required			
Santa Barbara Co. APCD All project sources Mobile sources only	 240 25	 240 25	 80 25				Consistency with AQP and AQ Supplment of Co. GP
Shasta Co. AQMD	25	25	80				
Siskiyou Co. AQMD	—	—	—				
South Coast AQMD	55	55	150 or 2.5 ug/m$_3$ - 24-hr	550 or 1.1 mg/m^3 = 1.0 ppm (1-hr. average)	Creates an objectionable odor > 10 D/T	MICR ≥ 10 in 1 million HI ≥ 1.0 (project increment) HI ≥ 5.0 (facilitywide)	
Tehama Co. APCD*	137	137	137				
Tuolumne Co. APCD	100 t/y	100 t/y	—				
Ventura Co. APCD Ojai Valley Rest of County	 5 25	 5 25	—				Projects with emissions >2 lbs/day- consistency w/ AQMP. GP Amend - consist w/ AQMP
Yolo-Solano AQMD	82	82	82	550			

(1) Thresholds were provided to MBUAPCD by districts unless indicated by a *. These (*) thresholds are from a Draft Survey prepared by Sacramento Metropolitan AQMD. October 1998.

February 28, 2000

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Hearing on March 16, 2000

Dear Ms. Janette:

Thanks for recently posting the March 16 meeting schedule and the agenda for the meeting.

In reviewing the schedule and the meeting agenda, it is clear to us that a full day's meeting is required in order to even begin to cover the information that is specified in the agenda.

4a-1 Additionally, the meeting should be devoted to discussions of the findings that are in the draft EIR document, especially the coatings technology and cost of reformulation issues. The averaging issue should be reserved for another meeting.

The key issues that require detailed review and discussion between staff and the industry at this time are the technology and costs issues that are raised by the proposed limits in the SCM. I have included with this communication a letter to you concerning the EIR's discussion of the technology required for the waterproofing concrete/masonry sealer category of coatings which gives an idea of the kinds of technology discussions that we believe are needed between staff and industry in an open session in order to ensure that the staff has a better understanding of the all-important technology and cost issues involved here.

4a-2 I understand that a number of coatings manufacturers have responded to the cost survey that was sent by CARB. In our follow-up on this we found that a number of coatings manufacturers had not received it and we put them in touch with where they could obtain another copy. I assume that some may still be responding even as we go to the meeting on March 16. But undoubtedly some of the new information will be available for the meeting. Thus, the meeting on the 16th will offer an important opportunity for a more comprehensive discussion of technology and costs issues to be undertaken than what has occurred heretofore. The kind of discussions we will undertake will include discussions of feasible technology and specific reasons why the staff agrees or disagrees with these discussions.

4a-3 The communication I am sending to you concerning the waterproofing concrete/masonry sealer category of coatings is a good example of what could be a basis for discussion. Staff may have sound reasons for its selection of the technology it recommends for this coating that adequately answer the submission of Textured Coatings of America. But if so, they are not found in the EIR document. Nor are they evidenced in the article that the staff cites in support of its decision, an article which actually supports Textured Coatings' position. Similarly, in our last telephone conference, the Sherwin Williams representative raised questions about the basis of staff's conclusion that since two pack systems are available in hardware stores, industry's concerns about their safe handling by non-professionals are misplaced. The Sherwin Williams representative asked for specifics about the type of two pack systems staff had found to be available for non-professional homeowners to use, pointing out that none are sold be her company, one of the largest paint companies in the United States. There was no answer to her question.

4a-4 Again, I emphasize that the purpose of an SCM is to identify best available retrofit control technology in order to reduce extensive fact finding by the districts when they go to adopt such technology in formal rulemakings. It is in everyone's interest that the SCM be factual based and not "pie in the sky" hopes. The only way this will occur is if industry and staff have frank exchanges in some detail about what is feasible and why.

With the above in mind, I request that a full day be devoted to the May 16 hearing.

Sincerely,

Jim Sell
Senior Counsel

National Paint & Coatings Association

2000
Received
A.Q.M. Branch
SSD

February 28, 2000

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Waterproofing Concrete/Masonry Sealer Category

Dear Ms. Brooks:

4a-5 I have attached the submissions of Textured Coatings of America. I am writing to let you know that the National Paint and Coatings Association fully endorses the statements made in the submissions.

4a-6 As you know from our previous conversations, the SCM development process to date has concerned us. In particular, we have had the impression that the staff has not adequately considered the technical information that has been provided by our industry, both in oral presentations in public and private meetings and telephone conferences and in written submissions.

Staff has not engaged in the type of dialogue with the submitters of the information that would indicate a genuine interest in determining what VOC limits are technologically and economically feasible to justify their being specified in the SCM. Instead staff has declined to engage in any discussions of specific performance characteristics of coatings with industry representatives, except by way of general statements such as "We believe that the limits are technically feasible."

The attached submissions from Textured Coatings of America are representative of the type of information staff has not responded to in any detail. These submissions are detailed, technically sound, and merit a detailed response from staff.

During the course of our discussions when we have raised concerns about lack of meaningful responses from staff concerning the technical information that was being provided, or the continued inclusion of what we believed to be unjustifiably low VOC limits in the draft SCM, we were informed to wait for the publication of the EIR publication where the technology rationales of the staff for selecting the limits would be presented.

4a-7 The EIR document is a disappointment in this respect as evidenced in its treatment of the technology at issue here -- waterproofing sealers for concrete coatings. The EIR's discussion of this issue is found at page 186 of the document under the heading of Concrete Protective Coatings. Additionally, the

4a-7 EIR document contains a table of various low VOC coatings for water proofing sealers both wood and concrete. Table E-24. None of this information adequately responds to the chief technical point made in the attached submissions from Textured Coatings – i.e., the lower VOC coatings do not have all of the important properties of Tex-Cote XL-70® Coating. Nor does the information in any way justify a conclusion that such lower VOC coatings will be technologically and economically feasible when the proposed limits become effective.

In fact, the 1996 Paint and Coatings Industry magazine article cited and quoted by the staff in its discussion of Concrete Protective Coatings contains information which substantiates the points made by Textured Coatings. It is striking and disturbing that the staff does not address the reservations expressed in the article about using low VOC coatings on concrete while at the same time quoting it for general information about the performance requirements that are needed for concrete substrates.

4a-8 A few quotes from the article demonstrate why we are concerned about whether the staff has sufficient information to reach its general conclusion that the higher VOC coatings can be adequately replaced by lower VOC coatings in the case of concrete protective coatings.

The article identifies two types of waterborne coatings--1) zero-VOC waterborne siliconates; and 2) linear siloxane polymers.

With respect to zero-VOC waterborne siliconates, the article warns against applying them to concrete:

> "Siliconates should not be applied to highly alkaline substrates, such as **concrete**, because neutralization does not readily occur to form the polymer network necessary for performance." (Emphasis added.) (At p. 86 of article.)

With respect to linear siloxane polymers, the following drawbacks are noted for application to alkaline substrates (like concrete):

> Unfortunately they also reduce alkaline resistance, while increasing the dirt pick up, slip and recoatability problems." (At p. 86 of article.)

Finally, this general point is made at the end of the article concerning the continuing need for solvent borne systems for alkaline substrates:

> "For more alkaline substrates [like concrete], products containing long-chain alkyl groups [solventborne systems] are required for long term performance." (At p. 88 of article.)

4a-8 We hope that these sorts of issues from the article will be addressed with specificity in our future meetings. It is puzzling why they were not raised and discussed in the EIR report in the first place when other aspects of the article were extensively quoted by staff.

4a-9 At the end of the day, an SCM is suppose to serve the purpose of identifying available technology so that the individual districts do not feel compelled to reexamine the recommended technologies. This would seem to require that the drawbacks of lower VOC coatings for particular applications be examined and discussed as thoroughly as conclusions that the coatings are technologically feasible.

4a-10 In conclusion, we request that the Waterproofing Concrete/Masonry Sealer coatings category that was recognized in the December 1, 1999 draft SCM be restored at its originally proposed limit of 400 grams per liter. In addition to the technical points raised in this letter and the attached submissions from Textured Coatings of America, I want to emphasize that even the SCAQMD determined that 400 grams of VOC per liter of coating is necessary for this coating. Moreover, the limit of 400 grams per liter for this coatings category <u>is the lowest established under any regulation in the United States.</u> It is impossible for me to understand how on the evidence in public record, including points made by the technical article cited by staff for its decision, that the staff could reject the May 14, 1999 decision of the SCAQMD staff that a minimum of 400 grams of VOC per liter of coating is necessary for the coating to perform adequately.

Sincerely,

Jim Sell
Senior Counsel

Comment Letter 4a

The commenter attached two letters from Textured Coatings of America. They are identical to Comment Letter #2a (Textured Coatings of America) of the Final Program EIR.

Si[illegible]ne, W[illegible]rne P[illegible]ing S[illegible]s P[illegible]t M[illegible]ased Co[illegible]tion [illegible]als

A [illegible] are used [illegible]ased ma[illegible] the users [illegible]sing the [illegible]ology ma[illegible]sis.

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A wide range of construction technologies use mineral-based materials to build long-lasting, durable office buildings, factories, roads and homes. Traditional building products, as well as new, innovative offerings using concrete, cement-bonded materials, stuccos, exterior insulation and finishing systems products, bricks and mortars, ceramics, gypsum compositions, roofing products, and natural stones, are used in the construction market.

Until a few years ago, most of these products were believed to be fairly resistant to aggressive substances in the environment, but examples of degradation have been found to be more prevalent than originally thought. America's roads and bridge decks are under constant repair to retain their strength and safety for motorists. Masonry buildings require tuck pointing, as well as cleaning and replacing complete sections in cases where spalling and structural integrity are lost.

Sidewalks and driveways crack. Commercial-building facades also effloresce and crack, which leads to costly repairs. In the most extreme cases, the buildings are torn down. Homeowners repaint block walls discolored from dirt and biological growth, replace rotting plywood not protected by mineral-based finishes and fix cracked driveways.

History has shown that for every 100 buildings, 24 are damaged in the first year, 15 in the second, seven in the third, six in the fourth and three in the fifth. This means that 55% of all buildings are damaged within five years. The annual cost of this damage can run into the billion-dollar range.

Water Intrusion Causes Degradation

Aside from abrasion, virtually all degradation involves water. Mineral construction materials can, by virtue of their pore structures, absorb water through their capillaries. Water enters not only through exterior facades, but also by the humidity within buildings, by groundwater and by penetration through cracks, seams and joints. As a result, film-forming surface coatings cannot keep water out completely and can even trap it within the construction materials. This results in absorbed water that often carries harmful substances, enters mineral-construction materials and causes degradation through mechanical-, chemical- and biological-based mechanisms.

Water itself causes freeze/thaw damage. In many construction materials, this can be reduced or eliminated by using air entrainment; however, where this is not possible or desired, other technologies are required. Water can also carry dirt, which can require expensive cleaning and coating applications to restore the appearance of the construction materials (see Figure 1).

Substances dissolved in water, especially chloride compounds (from road salt), are much more deleterious than freeze/thaw effects. Both chloride and sulfate ions carried by water chemically cause expansive forces that degrade rebar- and lime-containing construction materials. For example, the high alkalinity of new concrete protects steel rebars against corrosion, but as concrete ages, carbonation occurs, and the alkalinity of concrete is lowered. Alkaline protection is lost and water-carrying chloride ions penetrate, causing steel to corrode.

When steel corrodes, its volume increases by a factor of 2.5, giving rise to forces that a thin concrete covering cannot withstand. These expansive forces are also created when acid rain interacts with concrete and forms higher-volume calcium sulfate from calcium carbonate. This causes the concrete to spall. Protecting construction materials, therefore, always means protecting them against chemical sources of degradation (see Figure 2).

Water in construction materials supports biological growth that degrades mineral-based materials. Insects bore into construction materials causing degradation, and fungi penetrate into pore structures, reducing structural integrity and causing darkening often mistaken for dirt (see Figure 3).

Protective Technologies

Coatings and sealers cannot make up for poor construction. Nonetheless, they clearly play a major role in extending the useful life of many structures. While coatings often contribute a small fraction of the total construction cost, their performance is crucial to service life. This is especially true in construction markets in which a wide variety of sealers are used to protect mineral-based materials.

Continuous Sealers (Film-Forming Sealers)

Continuous sealers protect building materials by forming a complete barrier that stops water intrusion. However, as a result of their continuous films, they are typically resistant to gas permeation. While this resistance can be desirable for some applications, vapor transmission is beneficial for long-term sealer and substrate performance in other applications.

Water absorbed by materials coated with continuous sealers cannot escape, and moisture becomes trapped beneath the sealers. When this occurs, both hydrostatic and vapor pressures might exceed the adhesive strength of the film, which results in cracking and blistering. This coating failure leaves the substrate unprotected and requires recoating. Continuous seals also inhibit carbonation, which is essential for hardening and strengthening cementitous materials (see Figure 4).

Discontinuous Sealers (Impregnating Sealers)

Discontinuous sealers protect building materials from water intrusion, but some of them also allow water absorbed into construction materials to escape. Additionally, where vapor permeability is retained, carbonation is allowed to continue strengthening building materials over time.

Many classic, nonsilicone, impregnating sealers based on wax, stearate and silicate technologies are not vapor-permeable, since they physically fill pore structures to repel water. Where a complete sealer is desired that resists both water and vapor transmission, these materials can work very well. In most above-ground applications, however, it is desirable to use long-lasting, vapor-permeable technologies and products.

Silicone Discontinuous Sealers

For several decades, silicones have been revolutionizing the approach to construction-material protection. Water damage can effectively be prevented with silicones by treating the mineral substrates. Silicones, although best known for their hydrophobic properties, are also resistant to UV light, microbes and weathering, resulting in long-lasting performance.

How can silicones repel water so effectively and yet manage to remain permeable to water vapor? To use an analogy, they function like leaves do in nature. Leaves hold water at bay, allowing it to run off the surface, but they can also exchange gases with the environment.

Silicones owe this property to their molecular structure. Chemically, they range between organic and inorganic compounds, with each molecule having an inorganic backbone that resembles quartz (SiO_2) in structure, to which are attached organic groups, denoted by R-. Thus, the molecules have a highly specific spatial structure. They align themselves on the building materials with their inorganic backbones (-SiO-) against the surface and the organic groups (R-) projecting outwards to present a barrier to moisture and render themselves water-repellent and nonwettable. The silicone molecules, however, do not fill the pores of the substrates, so the surface retains its permeability to water vapor and breathes. Treated buildings do not suffer from condensation damage (see Figure 5).

Because silicones do not fill the pores, the water-repellency effect can be overcome by hydrostatic pressure. For this reason, they are not used for sealing foundations, but are applied to vertical and steep surfaces. Building materials also impregnated with silicones absorb very little water and can readily release it again in dried conditions.

Another characteristic of some silicone sealers is that they are solvent-free. Since the only volatile organic compounds (VOCs) come from the alkoxy groups that hydrolyze to form alcohols during curing, these sealers are environmentally friendly. Their VOCs are typically less than 300 g/l when measured using ASTM D 5095 and Environmental Protection Agency Method 24.

Silicone Sealer Composition and Performance

A wide range of silicones with a variety of compositions, properties and performance characteristics are used to protect mineral-based materials. Depending on the end-user's requirements, choosing the correct silicone technology for a specific application requires some analysis.

Fig. [illegible] mas[illegible]

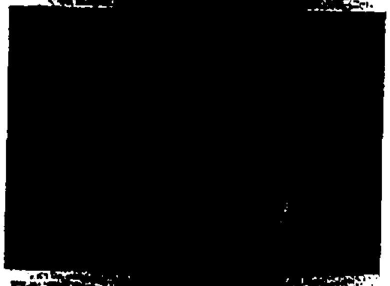
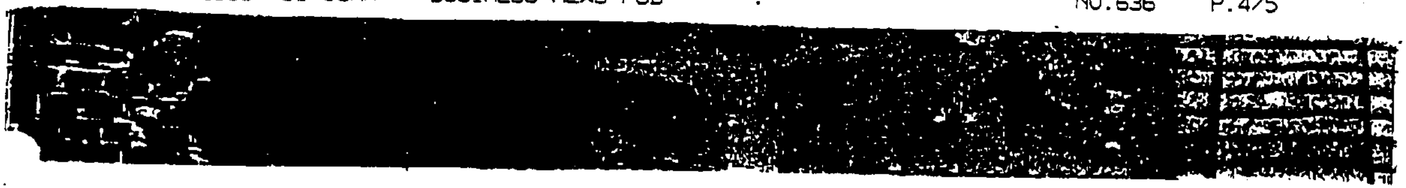


Fig. [illegible] wall [illegible]

Fig. [illegible]

Fig. 4 [illegible] ing and [illegible]



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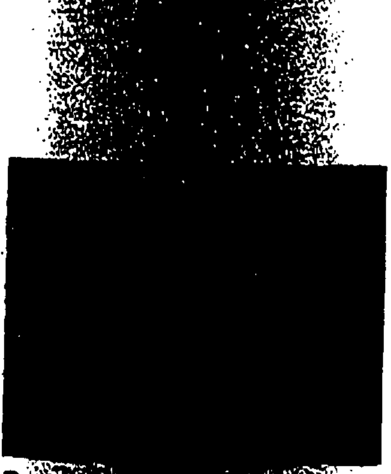

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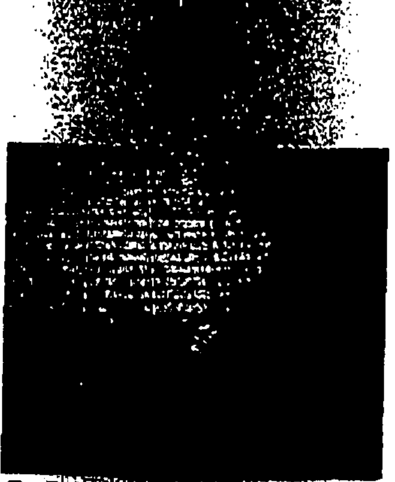


Fig. 7 [illegible] treated on
a rainy [illegible] siloxane
(lighter [illegible]

Siliconates

Siliconates are zero-VOC, waterborne products that work well on porous, neutral substrates where adequate control over their application is used to avoid excess carbonate salt formation. They cure by a different mechanism than silanes and siloxanes, using a neutralization reaction that relies on carbon dioxide in the air.

Siliconates should not be applied to highly alkaline substrates, such as concrete, because neutralization does not readily occur to form the polymer network necessary for performance. This is not a problem on neutral substrates, including clay products, where neutralization can easily occur.

When siliconates cure, carbonate salt byproducts, usually potassium or sodium carbonates, are formed. These white salts can be difficult to remove from dense substrates, particularly if the siliconate is over-applied. On porous substrates, the salts are carried into the substrate and are not seen, even with overapplication.

Siliconates provide long-term protection for neutral, porous, mineral-based construction materials. Since they are highly caustic and prone to over-application, siliconates should be used in situations in which trained personnel can apply them.

Linear Silicones

Linear siloxane polymers (dimethylsiloxanes) are widely used in several applications, including textile treatments, automobile polishes and sealants. Recently, they have been formulated into penetrating sealers and pigmented coatings for mineral substrates that help lower costs and provide elastomeric properties. Unfortunately, they also reduce alkaline resistance, while increasing dirt pick up, slip and recoatability problems.

When formulated properly, crosslinking silanes and siloxanes provide water-repellent, vapor-permeable sealers without the problems mentioned with linear siloxane polymers. In fact, they are often used as primers and increase adhesion between paint and mineral substrates.

Relatively neutral-pH, crosslinking silanes and low-molecular-weight siloxanes cure by hydrolysis and condensation on both neutral and highly alkaline substrates to form water-repellent sealers. Since water is necessary for curing, surfaces should be prewetted in low-humidity environments.

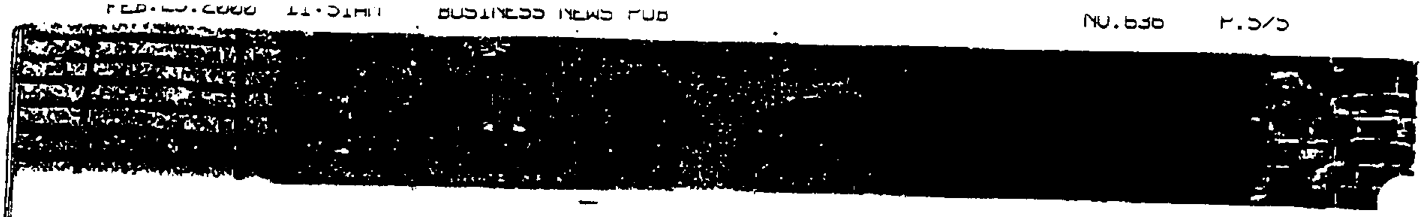
Silicone-based, water-repellent penetration can generally be explained by thinking of the substrate as a highly polar stationary phase in column chromatography. Not surprisingly, the polarity of the solvent used to deliver silicones has a strong influence on penetration. Silicones penetrate more deeply in nonpolar mineral spirits than in the more polar alcohols or in water. Smaller molecular size and lower viscosity also promote increased penetration, as demonstrated by the depths of penetration achievable using silanes. Highly polar waterborne siliconates do not penetrate as well as silanes and solvent-based products on highly polar substrates such as concrete.

While deep penetration is often considered an advantage, it should be understood within the context of the desired performance. Where a significant amount of abrasion is expected, as in Department of Transportation applications, high penetration is needed. However, in cases such as commercial-facade protection and most DIY applications, high penetration is not needed or desired. In these areas, it is costly to treat substrates to depths that are not needed for protection.

Siloxanes are known to penetrate well into mineral substrates, but not as well as silanes due to their higher molecular weight and viscosity. At the same time, they have higher vapor pressures and do not volatilize readily. This is demonstrated in typical applications in which silanes are used at much higher use levels (20% to 100%) than siloxanes (5% to 20%).

Since siloxane-based products remain on treated surfaces and do not readily volatilize, greater care needs to be taken during their application because applying too much material can cause darkening. Silanes, on the other hand, show a higher tendency to evaporate from substrate surfaces, so even 100%-active materials can be used without causing darkening problems. Since these products are designed to leave substrate appearances unchanged, attention should be paid to darkening propensity when selecting a silicone-based sealer.

Some products are formulated using blends of silanes and siloxanes to achieve both increased depth of penetration and low use levels. This provides cost-effective products with penetration that is suitable for most applications.



Formulation Variables

Of course, a variety of different formulated silanes and siloxanes exist in the marketplace. How are they different? Aside from the alkoxyl functionality differences mentioned earlier, silanes and siloxane formulations contain different types of alkyl (R-) groups, which affect performance. The presence or lack of catalysts, strengthening agents, amino-functional silicones and surfactants also affects performance.

Generally, methoxy- or ethoxy-functional silanes and siloxanes release methanol or ethanol on curing. Methoxy-functional silicones cure more quickly than ethoxy-functional silicones and leave more active silicone resin on substrates by weight because methoxy groups are of lower molecular weight after curing than ethoxy groups (15 g/mol versus 29 g/mol). Conversely, ethoxy-functional formulations release ethanol, which is more environmentally friendly than methanol.

Newer concrete products require using alkaline-resistant silicones for long-term performance. Resistance is provided by silicones containing long alkyl chains and is due to the difference in aqueous solubility between methyl siliconates and long-chain alkyl siliconates.

On any high-quality alkaline substrate, bases can cleave to the silicone resins in an equilibrium reaction, which forms siliconates. The smaller, more water-soluble methyl siliconates wash away over time, whereas more oil-like, long-chain siliconates with low water solubility remain on the substrate to provide long-term performance. For example, the linear silicones and siliconates described earlier are generally methyl-functional and should not be used on alkaline substrates, while crosslinking silicones containing long-chain alkyl groups should be used on higher-pH and alkaline construction materials.

For neutral substrates, such as clay tiles, bricks, pavers and natural stones, silicone products need to provide their own source of catalysts or have the ability to cure without them. For alkoxyl-functional silicones, this requires an added catalyst, usually metal or amine. If alkoxyl-functional silicones are used on neutral construction materials, they should contain an added catalyst. For siliconates, no added catalyst is needed, since their curing mechanism involves interaction with carbon dioxide.

Silicones have been used for more than 30 years in Europe to strengthen and protect structures built with stone by consolidating and binding loose-pore structures and providing water repellency. With stone substrates, choose a water-repellent that is formulated with consolidation agents, as well as alkylsilanes and siloxanes, to physically tie materials in their pore structures.

Silane and siloxane water repellents are also formulated using amino-functional silicones that provide improved long-term beading effects, adhesion and water solubility. These additives used in small amounts function very well, but in larger amounts cause problems with recoatability and water-repellency performance. While some amino-functional silicone content is desirable where improved beading and adhesion are needed, the hydrophilic amine groups raise the surface tension of the sealer, therefore reducing its effectiveness.

[illegible]

A number of water-reducible and waterborne silane- and siloxane-based products are available that use various surfactants to reduce or stop hydrolysis reactions within the emulsified products. If hydrolysis and condensation do occur within the micelles, they will become hard spheres that will not spread and that cure upon contact with the substrate. Water-repellency performance will be lost.

Therefore, the emulsification system used for waterborne products is important for obtaining good performance. Enough surfactant is needed to ensure stability, but too much hampers initial beading and water-repellency performance. Although most formulators understand that good beading does not necessarily reflect good water-repellency performance, initial beading is regarded by many consumers as a measure of water-repellency, and by some commercial applicators as a measure of sufficiency of water-repellent application (see Figure 6).

Applications and Compositions

For many applications, environmentally friendly, silicone-based water repellents are available that protect mineral-based construction materials by providing water repellency, while maintaining their natural vapor permeabilty and appearances. Different properties and types of silicones are required for the various applications, depending on the substrate and performance requirements.

When significant abrasion is expected, highly penetrating products should be used. Silanes and siloxanes that deeply penetrate concrete are recommended. Use silane/siloxane blends to maximize performance and cost benefits in applications with less abrasion.

On neutral, porous substrates where application can be controlled, siliconates work well. If lower-pH sealers are asked for or dense substrates are encountered, catalyzed silane/siloxane products should be used. For more alkaline substrates, products containing long-chain alkyl groups are required for long-term performance.

Natural stone protection requires formulations that contain strengthening agents and catalysts. Alkaline-resistant silicones can be used, but are not necessary for long-term performance.

Increasing attention to environmental concerns has led to the development of water-reducible and waterborne formulations to meet consumer needs (see Figure 7). Emulsion stability then becomes a key parameter. Where beading is important, low levels of amino-functional silicones and surfactants should be used.

In many applications, multiple substrates and customer requirements can lead to combinations of the above characters for an acceptable product. A sealer for masonry walls, for example, should be formulated to work well on neutral brick as well as alkaline mortar, so a catalyzed, alkaline-resistant product should be used that provides water repellency while retaining the wall's natural vapor permeability. A sealer for household use will most likely need most of the identified properties since the end-use application is highly variable. ◆

National
Paint &
Coatings
Association

April 7, 2000

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Comments on the Draft Program Environmental Impact Report (EIR) for Suggested Control Measure (SCM) for Architectural and Industrial Maintenance (AIM) Coatings

Dear Ms. Brooks:

On behalf of the National Paint and Coatings Association (NPCA), we are providing comments concerning the Draft Program Environmental Impact Report for Suggested Control Measure (SCM) for Architectural and Industrial Maintenance (AIM) Coatings (February 2000). A number of our member companies will also be submitting comments.

The NPCA is a voluntary, nonprofit trade association representing some 400 paint and coatings manufacturers, raw materials suppliers and distributors. As the preeminent organization representing the paint and coatings industry in the United States, NPCA's primary role is to serve as ally and advocate on legislative, regulatory and judicial issues at the federal, state and local levels.

We estimate that over 80% of the volume of AIM coatings sold in California and which are at issue under the SCM are manufactured by NPCA members.

I. GENERAL COMMENTS

4b-1 NPCA has been extensively involved in development of VOC control regulations for AIM and other coatings in California since the inception of clean air programs in California, beginning in the 1960s. Our record in this regard has always been one of constructive cooperation. We recognize the obligations of the industry to contribute its fair share in coatings technology improvements to help with the clean air problems of California. The industry even without regulatory prodding has consistently lowered the VOC content of its coatings. We seek by our participation to impart to regulatory decisions our frank and best estimates of what is technologically feasible and the associated consequences and costs of selecting certain technologies.

Most recently we have been extensively involved in the development of the current draft SCM, including assisting CARB in obtaining responses to its various requests for information in connection with the development of the SCM. We encouraged our members to forthrightly respond to the CARB survey that is

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part of the factual basis for the SCM, and we encouraged members to meet with CARB staff in an effort to provide a better understanding of the complexity of the technology issues that are inherent in this regulatory effort to lower the VOC content of AIM coatings. NPCA staff and member companies have met with staff on a number of occasions in efforts to provide information that would provide a sound basis for developing an effective SCM for AIM coatings.

4b-1 As a general comment we have to say that we are disappointed with the process utilized to adopt the SCM in this case and in the lack of adequate fact finding.

The importance of this undertaking cannot be over emphasized. The SCM will stand as a presumptively valid decision about what are cost effective, commercially viable, and technologically productive coatings for usage in the forty plus air districts in California. At issue here are the millions of homes in those areas and important infrastructure, such as bridges and chemical storage facilities, related to the convenience and safety of the people in those areas. In making these critical comments, we hope you recognize that NPCA represents a the full spectrum of AIM coatings manufacturers in the United States, including companies that specialize in the development and manufacture of low VOC coatings.

NPCA does not have <u>(indeed could not have</u>) a position that only high VOC coatings technology is presently or foreseeably available. Aside from being a demonstrably inaccurate statement, it would cause us to lose those members that manufacture and sell low VOC coatings. Rather the position of the NPCA is as follows:

4b-2

> A low VOC product technology may be successfully used currently to meet the performance requirements of one particular application and exposure environment of a general class of coatings. However, there must first be a thorough evaluation of this technology before it can be mandated as being feasible for all or even most of the application, performance, and exposure requirements of the general class of coatings to which it belongs. For example, an expectation that currently available low VOC industrial maintenance coatings could effectively replace **all** other industrial maintenance coatings currently in the market place is completely at odds with the history of advances in coatings technology. Reliance on such an expectation to guide the Staff's inquiry would be dangerously misguided. There is no substitute for a thorough, open minded, and objective evaluation of existing and reasonably foreseeable coatings technologies in setting future VOC limits. We do not believe that this has occurred here.

It is important to note here that some of the NPCA member companies that are most concerned about the proposed limits are companies that manufacture low

VOC coatings and emphasize the sales of their low VOC coatings because of their profitability.

We note the EIR characterizes the SCM as follows: "To fulfill [its] statutory mandates, the ARB often provides guidance and other assistance to the districts, including the development of model rules, such as the Suggested Control Measure for Architectural Coatings." (Draft Program EIR at page I-2)

The SCM thus carries great weight with the individual air districts, which as staff has noted throughout this process are the agents that ultimately have to formally adopt the limits and requirements of the SCM as district rules before they can be effective. In this sense, however, the SCM my be better conceived of as a "suggestion" from a reviewing authority that ultimately has the authority to disapprove plans from the districts that do not achieve the progress thought achievable by CARB. As a practical matter, therefore, districts do not deviate greatly if at all from CARB SCMs, even in cases where they might have reservations about their conclusions. 4b-3

The EIR under discussion here is an instrumental document in the SCM adoption process as well as in the adoption of individual district rules that are based upon it. As noted by staff in the Draft Program Environmental Impact Report for Suggested Control Measure (SCM) for Architectural and Industrial Maintenance (AIM) Coatings:

> "This Draft Program EIR has specifically and comprehensively addressed the environmental impacts associated with the Architectural Coatings SCM in accordance with CEQA, so that the districts, if they choose to do so, may rely on the analysis in the Program EIR when adopting or amending their architectural coatings rules." (Draft Program EIR at page I-3)

Consequently, it is important for the Program EIR to be as accurate as possible in that districts may rely upon it with out further consideration. It will in short become a presumptively valid document that will not lend itself readily to subsequent questioning or criticism by the district.

It is for these reasons that we remain deeply concerned about what we consider to be fundamentally flawed conclusions about the technological and economic feasibility of many of the VOC limits that are the basis of the analysis of the EIR. If the staff is in error about the technological feasibility of the limits that it has specified in the SCM, then the environmental impacts assessed in the EIR are equally flawed. 4b-4

II. DUE PROCESS/INTERSTATE COMMERCE ISSUES -FEDERAL AND STATE

4b-5 Serious federal constitutional due process and interstate commerce issues can arise in the development of an SCM if it is not handled properly. As noted, the SCM is intended to serve as a consensus template for the districts to adopt without having to expend the time and resources that otherwise would be required of them. There is nothing inherently wrong with this approach and if implemented as intended, it can result in a more efficient development of reasonable regulatory requirements, saving both the regulators and the regulated community time and money. Problems can arise, however, if insufficient time and effort is afforded to ensure a full airing of issues. The potential for a classic "Catch-22" inheres in the process. The SCM is only guidance, so therefore it need not comport with the requirements of a rulemaking. The formal protections of rulemaking are intended by the process to be afforded when the districts consider adopting the SCM. But because the SCM supposedly reflects already vetted technology, districts are encouraged to rely upon the fact findings of the SCM for their fact findings. If in fact the SCM technology is not truly consensus technology, then the public never really has a realistic opportunity to a full airing of its concerns– the SCM is conducted without the requirements of administrative legally sufficient fact findings and the districts in turn are not required to reconsider the findings except as their discretion dictates. This raises concerns about the potential for denial of due process under the federal and California constitutions as well as the potential for unconstitutional interference with interstate commerce as the resulting regulation may impose disproportionate burdens on out of state manufacturers.

III. INFORMATION RELIED UPON BY THE EIR

The staff has relied upon the following for its conclusions in the EIR:

- Results of laboratory tests from the NTS study and other results from the 1995 Harlan Study

4b-6

- What the EIR characterizes as an "extensive" review of compliant coatings product data sheets.
- Results from the CARB 1998 AIM survey that the EIR characterizes as indicating that a large percentage of coatings already meet the proposed limits.
- Information on "foreseeable coatings technologies " obtained from resin suppliers and coatings manufacturers data sheets and (promotional) magazine articles

We discuss each of these and their inherent limitations below.

A. The EIR's Treatment of Test Data

The EIR's treatment of available test data manifests fundamental misconceptions about the effective use of such information by the industry.

4b-7 Coatings manufacturers extensively test new coatings before introducing them to the market. These test include two and three year field exposure tests because it is only under such real world conditions that new coatings' performance characteristics can be assured.

As mentioned in the EIR document, a number of the low VOC coatings that would be mandated by the SCM are the subject of a study being conducted by the SCAQMD pursuant to revisions to its AIM rule in May 1999. The EIR states,

> "In addition to the laboratory results, accelerated actual exposure, real time actual exposure, and actual application characteristics studies <u>are continuing. The results of the study are an important part of our technical evaluation of these six coating categories</u> (see Appendix D, Description and Technical Assessment of the Coating Categories). The purpose of the NTS study was to test the application and durability performance of very low-VOC, low-VOC, and just-compliant coatings for the following six coating categories:
> · Industrial Maintenance Coatings
> · Nonflat Coatings
> · Primers, Sealers, and Undercoaters
> · Quick-Dry Enamels
> · Quick-Dry Primers, Sealers, and Undercoaters
> · Waterproofing Sealers"
> (Emphasis added) (Draft Program EIR at page II-24)

4b-8

While the EIR states that the results of the study are an important part of the staff's technical evaluation for the six coatings categories, it must be noted that what the industry consider to be the most important tests - real time actual exposure, and actual application characteristics studies - have not been completed. Consequently, it will be necessary for the districts to evaluate the technology of the limits for these coatings before accepting them as technologically feasible. In this regard, we also note that in Appendix D of the EIR, there is language suggesting that these tests are not really necessary to warrant the conclusions reached in the EIR about the technological feasibility of the coatings at issue. As indicated, therefore, the SCM will be issued without the benefit of the most crucial results of the most important of these tests. Apparently, the staff believes that in some respects the laboratory results of the NTS study are sufficient to justify its conclusions:

> "The ARB staff has analyzed the impact of allegedly ineffective low-VOC coatings. There is a wide range of commercially available coatings that

> meet the proposed VOC content limits in the SCM. ..... Additionally, the results of the SCAQMD's NTS study support these findings. The laboratory results of the SCAQMD's NTS study reveal that there are currently available coatings that comply with the proposed VOC content limits and with coating and durability characteristics comparable to existing high-VOC coatings." (Emphasis added) (Draft Program EIR at page C-21)

4b-8 We disagree with this and believe that any decisions about the technological and economic feasibility of the limits proposed in the SCM for the six categories under consideration must await the final results of the study which will include real time actual exposure, and actual application characteristics studies.

In rejecting our request to formally commit to a technical assessment of the SCM limits prior to their becoming effective, the staff stated the following which suggests that it too believes that the final word is not in on its conclusion that the SCM proposes technologically and economically feasible coatings limits.

4b-9

> "Even though the ARB staff believes that compliant coatings are available to meet the SCM limits, we are committed to working with the SCAQMD, other interested districts, and the architectural coatings industry as they conduct technology assessments of the future VOC limits...... Since the ARB staff will be conducting the assessments, we do not believe that it is necessary to include a technology assessment provision in the SCM ...... After each technology assessment the ARB staff will report the results to the staff of each district, and district staff can then report to their District Governing Boards as to the appropriateness of maintaining the applicable future VOC limits." (Draft Program EIR at pages C- 7-8)

These statements taken as a whole indicate that the conclusions of the staff about the feasibility of the limits and coatings the SCM proposes are suspect and will require further analysis.

4b-10 Additionally, it is our position that the NTS study laboratory results that are available are suspect in their own right as has been explained to staff in a letter from Christine Stanley, Vice President of Technology, of Ameron Coatings. See also NPCA's letter to Jim Nyarady on this subject.

With respect to the Harlan Study there are several issues.

4b-11 It is an incomplete report, providing only raw data. The Abstract of the study states:

> " Data were complied for each product evaluated and is presented in this report. No comparison of the properties or performance of the samples was required by this contract." (Emphasis added) (Harlan Study at page 4)

The evaluation of the raw data was left to the ARB staff and not to the contractor who was the coatings expert.

The report consists of a series of summary tables and test reports for individual coatings. Information on individual coatings (such as recommended use and application of each of the coatings tested) is NOT included in the report. This makes it very difficult to evaluate and compare the data in the summary sheets .

4b-11 The report was not peer reviewed. Without some industry involvement or review of the testing and reporting of the data, the conclusions based on the report are suspect.

Blind samples were used making any verification or comparison to other test results impossible. On the other hand when other testing groups, like Consumer Reports Magazine, do coatings testing, the products and manufacturers are identified so that any inconsistent or erroneous results can be spotted and challenged.

Different contractors were involved. Many of the tests performed in the study are very subjective types of tests, in which the results can vary markedly from technician to technician, e.g., pencil hardness, block resistance, application properties adhesion.

There is no indications of what if any QA/QC procedures were used. Nothing is mentioned about the qualification of the laboratories or their personnel and their QA/QC procedures.

The Appropriate Way to Make Coatings Technology Comparisons

With respect to making comparisons of low VOC coatings with higher VOC coatings Table IV-2 in Chapter IV of the EIR does so on the basis of the following characteristics of a coating

4b-12

- Range of VOC
- Average VOC Content
- Average Solids by Volume
- Average Coverage
- Average Dry Time
- Average Pot Life
- Average Shelf Life

All of the above are interesting but relatively insignificant properties of a coating. They do not really tell one anything about the performance and durability characteristics of the coating or its suitability for a particular job .

A true comparison of coatings characteristics must take into consideration the following factors:

4b-13

- Performance - how does the coating perform – What type of exposure was coating formulated to withstand, e.g., acid- base; waste water, high temperature? What are its real performance characteristics? Performance is more than cure time and shelf life. It includes durability under real life/field conditions.
- Application latitude – What type of equipment is need for application? Is highly sophisticated spray equipment required? Are there any limits on the application temperature or atmospheric (humidity) conditions under which it can be applied? What film thickness does it have to be applied at in order to meet the required performance characteristics?
- Surface latitude – What type of surface can the coating be applied to and what type of surface preparation MUST be done to insure a proper job? Surface preparation is crucial if an acceptable job is to be completed.
- Cost effectiveness – An important and crucial factor that could tip the decision on whether a coating job is undertaken. Cost effectiveness includes the review of the service life of the coating, its application costs and required surface preparation, as well as the cost of the coating itself.
- Waste considerations: Will the use of a particular coating generate a high amount of waste product and will any special surface preparation cause the generation of additional solid or hazardous waste, e.g., old heavy metal containing coating that MUST be totally removed before the application of the new highly sophisticated coating 2K product.

These are the essential issues that have to be addressed when evaluating whether one coating can be substituted for another. For industrial maintenance coatings and other high performance coatings this is a very complex task.

4b-14

It is obvious from a reading of the EIR that CARB did not consider these five very important factors in its review of product data sheets. These are the key factors that any knowledgeable coatings formulator, specifier or applicator would consider crucial in deciding whether a particular coating is suitable for a particular application.

It is our position that before any district could reasonably adopt the limits of the proposed SCM, it should undertake an evaluation of these factors with respect to the coatings at issue.

B. Review of Compliant Coatings Product Data Sheets

4b-15 It appears that too much reliance has been placed upon product data sheets for the staff's conclusions. This is particularly troublesome in light of the fact that product data sheets often require review by a coatings expert in order to be fully comprehended. An example of the basis for our concerns is seen in the following statement from the EIR:

> "ARB staff evaluated hundreds of conventional and low – VOC coatings product data sheets. The product data sheets indicated that low-VOC coatings do not require substantially different surface preparation, including power washing, than conventional coatings." (Draft Prgram EIR at page C-15)

This statement is completely at variance with what is commonly known within the industry and in fact is implemented in training and education by such organizations as Paint and Decorating Contractors of America and the Society of Protective Coatings, i.e., more attention to proper surface preparation is required of the newer two pack high performance coatings than conventional coatings. It is also true that instructions for conventional coatings require adequate surface preparation. But the staff's equating the degree of surface preparation required by two types of instructions that are associated with radically different coatings gives us concern that it does not fully comprehend the greatly differing consequences associated with using these two different coatings systems.

4b-16 Staff's reliance on the product data sheets also apparently convinced it that there are no pot life problems associated with multi-component systems:

> " Regarding pot life, the ARB staff's review of currently available, multi-component low-VOC coatings revealed that pot-life problems are not anticipated." (Draft Program EIR at page C-18)

This too is completely at variance with the real world experience of the industry, notwithstanding individual product data sheets that may minimize the problems or state that they are not substantial if "instructions for use" are <u>closely</u> followed. As explained in comments being submitted by Ameron Coatings concerning the EIR, the pot life issue is an extremely significant and complex issue affecting the cost of application.

4b-17

C. Results from the CARB 1998 AIM Survey

With respect to the results from the CARB survey, we again caution that low VOC product technology may be successfully used currently to meet the performance requirements of one particular application and exposure environment of a general class of coatings. However, there must first be a thorough evaluation of this technology before it can be mandated as being feasible for all or even most of the application, performance, and exposure requirements of the general class of coatings to which it belongs.

D. Information on "Foreseeable Coatings Technologies" from Promotional Materials of Resin and Coatings Manufacturers

4b-18 Caution should be exercised in relying on information from resins and coatings manufacturers and their promotional materials that are published in trade journals that are not peer reviewed. Statements about the properties of a resin starting formula are just that – where the coatings formulator begins to determine whether an adequate cost effective coating may be developed based on it.

E. Appendix E Tables

4b-19 As numerous industry commenters have pointed out, many of the coatings products listed in the tables in Appendix E do not belong in the coatings category in which they are listed. For example: over 30 percent of the products listed as lacquers are in reality polyurethane varnishes.

IV. DISCUSSION OF SPECIFIC COATINGS CATEGORIES

A. Floor Coatings

4b-20 Originally as this category was developed under the national AIM rule it was defined as:

> "an **opaque** coating with a high degree of abrasion resistance that is formulated and recommended for application to flooring including, but not limited to, **decks**, **porches**, and **steps**, in a residential setting"

During the discussions surrounding the development of the revisions of SCAQMD's Rule 1113, the reference to residential setting was dropped in order to expand the use of the coatings to commercial and institutional settings.

CARB now would expand the definition to cover floors exposed to extreme environmental conditions which historically have been covered by industrial maintenance coating category. In so doing, it would prevent the use of higher VOC industrial maintenance coatings on floors in settings that require such coatings. This would mean that the conditions would allow for use of the industrial maintenance coatings on walls, but only lower VOC materials could be used on the floors exposed to the same conditions.

4b-21 The data sheets that CARB is relying on to make their decision concerning the VOC limitation cover a wide variety of product types and hodge-podge of coatings technologies. These products range from simple latex porch and deck enamels used by home owners (which have very limited applications and uses) to "exotic" 2-K materials that require complex mixing and application equipment and special surface preparations (only available to trained professional applicators) or which pose safety concerns. These materials often are accompanied by such warnings as,

4b-21

> " For industrial use only by professional applicators"; or " An eye wash and safety shower should be nearby and ready for use."

Others are elastomeric floor coatings that require film build of over 22- 24 mils in order to be effective. And others have severe use limitations, e.g., they are not recommended as exterior topcoats or are not be applied to horizontal surfaces that become slippery when wet.

Additionally, a number of the products cited by the EIR for the low VOC floor coatings only represent raw material suppliers best "suggested starting formulas" and are not commercially viable products.

Also, several of the coatings listed as floor coatings do not belong in the "floor coating" category, e.g., " semi clear concrete sealers and safety and zone marking paint."

4b-22

It should be obvious from the wide variety of products currently being sold as floor coatings, that no single product or technology is able to satisfy all of the varying application conditions and performance requirements covered by this category. The ARB's decision to totally rely on high end 2-K or polyurethane technology that is normally marketed for industrial application only by professional painters is flawed and does not reflect the true market place needs for floor coatings in all situations such as residential, institutional and commercial.

We recommend that the definition for "*floor coating*" be revised to read:

> "*Floor Coating: An opaque coating formulated and recommended for application to flooring including, but not limited to, decks, porches, and steps, for the purposes of abrasion resistance.*"

4b-23 Also the definition for "*Industrial Maintenance Coatings*" should be revised to remove the phase "*excluding floor coatings but*".

B. Non Flat Coatings; Primers, Sealers and Undercoaters; Stains; Industrial Maintenance Coatings; and Lacquers

4b-24

Through out this process, NPCA has attempted to bring in the coatings experts from its membership to discuss the technological and economic feasibility issues that are involved with the proposed SCM limits. We are particularly concerned about the coatings identified above and we urge CARB to consider the comments and information that have been provided by our members and other coatings experts. In doing this we believe that CARB should rely on the consensus judgement of the experts.

C. Categories Not Proposed for Inclusion in SCM

4b-25 There are sixteen categories of coatings that are recognized by the national AIM coatings rule which are rejected for inclusion in the SCM. Among the reasons cited for this decision in the EIR are the following:

> "With the exception of antigraffiti coatings, these categories are not generally included in any of California's district architectural coatings regulations. The products under these categories are currently either: (1) subject to other coating categories in district regulations; (2) sold only under the small container exemption; or (3) not sold in California (at least in areas with architectural coatings rules). Nevertheless, we researched each of these categories because they were included in the U.S. EPA's architectural coatings regulation, and because in many cases these products will be subject to lower VOC limits under the proposed SCM compared to current district regulations. In researching these categories we considered a variety of factors, including: (1) the VOC limit they would be subject to under the proposed SCM; (2) the potential for reformulation as demonstrated by similar products already complying with the VOC limits in the proposed SCM; (3) the availability of products that do not fall under the category as defined in the national rule, but fulfill the same basic function at a lower VOC content; and (4) the extent to which products under the category are used in California. As explained in the following sections, we do not believe it is necessary to incorporate a new category and VOC limit for any of these categories." (Draft Program EIR, Appendix D, at page 178)

We understand that staff is reconsidering its initial decision to exclude the concrete protective coatings and now plans to incorporate the "concrete protective coatings" category recognized by the national AIM coatings rule at a VOC limit of 400 grams per liter in the SCM. In doing so, the staff appears primarily to rely upon on the information provided by Textured Coatings of America, an NPCA member. NPCA fully endorses the position of Textured Coatings and the inclusion of this category.

4b-26 Another coating at issue here is the thermoplastic rubber coatings and mastics coating. (Draft Program EIR, Appendix D, at page 205) Inland Coatings, an NPCA member provided information to staff requesting this coating as defined by the national AIM coatings rule at a limit of 550 grams per liter of coating. It has provided information to justify its inclusion, and is prepared to provide more to staff in this connection. Discussions with staff about the exchange of information between Inland Coatings and staff indicate that there may have been some miscommunication. Staff stated that the company failed to provide sufficient information that demonstrated that its thermoplastic rubber products are more durable, and result in less emissions over time than comparable bituminous roof products or latex roof products. "We have no data to substantiate that thermoplastic rubber roofing products outlast their bituminous counterparts. We also note that latex roofing products are available." Staff also rejected the company's claim that its thermoplastic rubber products work in situations where water-based or bituminous products fail, e.g., they adhere well to single-ply membranes and adhere well when exposed to ponding water. "We have no data to substantiate these performance claims." The EIR concludes this discussion by stating, "...since thermoplastic rubber products are not used in California, we assume that other roofing products can be used to address these situations." 4b-26

It is our understanding that the company has attempted to respond to these points and is prepared to provide more information on this matter. For example, with respect to the issue of durability, it is generally accepted information within the industry that coatings like Inland's dramatically outlast bituminous coatings. The nature of bituminous coatings is that they are of limited durability, and must be repaired and refurbished on a fairly regular basis. Inland Coatings can demonstrate single application, no repair histories for its coatings extending over several years. If this information was not provided in a manner that staff found sufficient, the company is prepared to provide more information. The same is true of its claims about single-ply membranes, with one of the major manufacturers of singly ply membrane coatings recommending Inland Coatings for repair of its product. Finally concerning the fact that the company's product is not used in California, this has occurred only because the company has refused requests from distributors to carry its product for unregulated areas in California simply from concern that through no fault of its own, the materials might wind up in a regulated area where they would be noncompliant. It is ironic that Inland's conscientiousness about California's clean air requirements now work against it for a reason that is wholly unrelated to issues of technological efficacy and more efficient methods for reducing over all VOC emissions from coatings.

4b-27 Another coating that falls into this category is nuclear coatings about which Ameron Coatings, an NPCA member, has provided comments. The point being raised by the company is that the proposal would require the use of coatings that would be astronomically more expensive than existing systems and this added expense is grossly disproportionate to the minuscule amounts of VOC emissions that result from the small usage of the existing coatings systems. We urge you to consider the company's comments.

4b-28 NPCA also believes that the staff should reconsider its decision to exclude the other categories. In particular, we do not believe that the staff has had an opportunity to receive or fully review all of the information that would be necessary in order to make a sound decision on these coatings. It must be recognized that the process to date has necessarily focused on the larger coatings categories and the manufacturers of the coatings at issue here, many of which are niche market coatings, are often small businesses that need more time to respond. We request that this be given some consideration and that staff keep the door open for additional information about these coatings.

4b-28 In reviewing data and technology for this area we suggest that the following general principles be considered. It should be recognized that coatings are developed for certain purposes. In this highly competitive industry, if a lower VOC product can cost effectively serve the same coatings requirements of a higher VOC product, it is selected over the higher VOC product. The U.S. Environmental Protection Agency in developing the national AIM coatings rule recognized this and the fact that many of these coatings were low volume niche coatings that previously fell under the general category of industrial maintenance coatings. They had to be specifically identified and broken out as coatings in their own right when the industrial maintenance coating category was lowered to VOC levels that were below the levels needed for these coatings.

The EIR is very cursory in its discussion for excluding these coatings, often stating little more than assumptions that are based upon the general coatings category of industrial maintenance coatings. Data concerning these coatings may not have been reported under the category. For example, with respect to chalkboard resurfacing coatings, the EIR reflects that only a very small portion of the coatings reported in the CARB AIM survey were identified as chalkboard resurfacing coatings. It is likely that some of the volume used in California was reported as general industrial maintenance coatings.

Consequently, CARB should consider the possibility that information developed later in the rulemaking will demonstrate that indeed a higher VOC limit is required for these coatings. Like comments apply to the other excluded coatings categories. In any event, NPCA plans to continue to track this area during this rulemaking and to provide additional information on these excluded coatings as it becomes available to the NPCA .

V. REGULATORY ALTERNATIVES

A. Averaging

4b-29 We are concerned that ARB has not chosen to include an Averaging Compliance Option in the proposed SCM or at least retain the placeholder Statement on Averaging that appeared in the December 1, 1999 draft of the SCM. Last December, the ARB formed a joint committee with SCAQMD to develop a workable averaging program. While we agree there are clearly differences between industry, SCAQMD and ARB on how to design a workable averaging program, ARB has chosen not to move forward with trying to resolve these difficulties. Instead the ARB has placed a lower priority on developing this program by indicating "... but the existence or absence of averaging does not affect either the ARB's analysis of the technical feasibility of the VOC limits in the SCM, or the ARB's environmental analysis for the SCM." (Draft Program EIR at page V-159)

4b-29 We disagree with this position. In fact, averaging will be required to make some of the requirements feasible.

The ARB's proposed SCM is nearly identical to the SCAQMD's revised Rule 1113, a rule which was developed for the only district in the country ranked as severe ozone non-attainment area. Without an averaging provision, ARB's proposed SCM is more restrictive than the SCAQMD's revised Rule 1113.

B. Extended Compliance Deadlines

4b-30 In of Chapter V. Project Alternatives, the ARB discusses four regulatory alternatives. Alternative B would extend all of the effective dates for the VOC content limits to January 1, 2004 with the VOC content limits for the affected coatings being identical to those in the February 11, 2000 draft. The ARB staff has rejected this alternative saying that any delay in achieving these emission reductions is not technically or economically justified. We disagree with this conclusion and urge the ARB to review their decision in light of industry's comments on the technical merits of the ARB's SCM development.

VI. MODEL FORMULAS TO ESTIMATE POTENTIAL MATERIALS COSTS

There are fundamental problems with the use of model formulas to estimate potential material costs.

4b-31 The approach carries the inherent assumption that only one coating technology (resin technology) will be used to meet the lower VOC limits. Said another way, the approach implies that one technology will meet all the requirements of a category. This is unlikely and therefore the approach will not accurately estimate associated reformulation costs.

The model formulas are simplistic. Generally one cannot simply substitute a low VOC resin for a high VOC resin without changing other important components of the coating.

To obtain anything close to approximating a realistic estimate using this approach world require the use of real world formulas.

4b-32 A more straightforward and more accurate way of estimating and comparing raw material costs of high and VOC coatings would be to compare only the cost of the high VOC resin to the low VOC resin on a WEIGHT OR VOLUME SOLIDS basis. By doing this one would at least get an idea of the magnitude of the cost difference, e.g., 1.5 time or 2 times more costly.

To obtain a better cost comparison beyond this, one would have to have to actual formulas for the current high VOC product and the low VOC replacement.

4b-32 Also it is important to note that raw material cost are only one factor in calculating the total cost of reformulating coatings. Additional costs include packaging costs, direct R&D labor, etc.

VII. CONCLUSION

4b-33 We appreciate the opportunity to provide comments on the EIR. We will continue to work with staff in the development of the SCM with a view to providing it with our best judgments about the technological and economic feasibility of the coatings technology decisions it is contemplating. But ultimately, the issue of whether Californians will continue to have access to cost effective, productive coatings rests with CARB and the districts. Our goal is to ensure that we have provided the decision makers with our best technical information and judgement.

Sincerely,

Jim Sell
Senior Counsel

Robert J. Nelson
Robert J. Nelson
Director Environmental Affairs

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

March 1, 2000

Mr. Jim Nyarady
Strategy Evaluation Section
California Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, CA 95812

Re: Comments on Proposed Amendments to the Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

5-1 At the most recent meeting of the Architectural Coatings Working Group on February 3, 2000, an overview of the latest changes to the Suggested Control Measure (SCM) was presented. This letter contains the Environmental Protection Agency's (EPA) comments on changes to the draft SCM since the version dated December 1, 1999. This includes proposed language changes contained in the January 28 and February 11, 2000 drafts. We are primarily concerned with the clarity and enforceability of the SCM and its stringency relative to the EPA's National AIM Rule (40 CFR Part 59, Subpart D) and current coating technology.

Our discussions at the February 3 Working Group meeting and our initial review of the draft SCM reveals that the most significant changes relate to the postponement of the effective date of the regulation and the addition of several specialty coating category definitions and limits. These changes are generally consistent with national regulations and reflect available coating technology. Listed below are several areas where we question certain proposed changes to the SCM. Section numbers refer to the February 11, 2000 draft unless otherwise indicated.

5-2 1. The new category for temperature-indicator safety coatings is defined in Section 2.52. Based on the definition, it is unclear how these coatings differ from the high-temperature coatings defined in Section 2.24. Both groups of coatings must sustain exposure to temperatures above 204 degrees Celsius. Does the ability of temperature-indicator safety coatings to change color necessitate the higher VOC limit contained in Table 1?

5-3 2. The provision in Section 3.2 that the most restrictive VOC limit shall apply in cases where a coating meets the definition for more than one coating category has been changed. It appears that the removal of certain language in Sections 3.2.2, 3.2.5, 3.2.8, and 3.2.9 have broadened the

5-3 exception to Section 3.2. The addition of Sections 3.2.11-14 also appear to widen the scope of the exception to Section 3.2. Collectively, these changes make the "Most Restrictive VOC Limit" provision less stringent than the corresponding provision in EPA's National AIM Rule §59.402(c). These differences between the applicable VOC limits in the SCM and the National AIM Rule created by variations in the wording of this provision may cause confusion among the regulated entities.

5-4 3. Certain labeling requirements for quick-dry and recycled coatings previously contained in Sections 4.1.7 and 4.1.10 of the January 28, 2000 draft have been removed from the SCM. It is unclear why these sections have been removed. Section 4.1.10, in particular, should be retained for consistency with the labeling requirements contained in the National AIM Rule §59.405(c).

5-5 4. The reporting requirements for recycled coatings previously contained in Sections 6.5.1-3 of the January 28, 2000 draft have also been removed from the SCM. The information that was previously required under these sections to be reported must still be reported to EPA under the National AIM Rule §59.408(c). Submission of this information to CARB should not constitute any additional burden for manufacturers or importers of recycled coatings and should be tracked by CARB to ensure that recycled coatings are meeting the minimum percentages of secondary or post-consumer contents specified in Section 2.38 and are resulting in the diversion of these coatings from landfills.

5-6 5. The proposed 530 g/L VOC limit for antenna coatings, although consistent with the EPA's National Rule VOC limit, may create a relaxation issue for certain districts who wish to add this category to their local rules and who have SIP approved rules containing a 420 g/L limit for industrial maintenance coatings. Appendix D of the draft EIR (page 20) indicates that antenna coatings are subject to the industrial maintenance category. Once separated from the industrial maintenance category, antenna coating formulations could increase in VOC content from 420 g/L to 530 g/L.

5-7 Aside from these larger issues, the draft SCM contains a minor editorial error. The category and VOC limit for low solids coatings appears twice in Table 1. One of the entries should be deleted.

Thank you for the opportunity to comment on the proposed amendments. We acknowledge the effort involved in characterizing this broad VOC source category and developing this type of guidance. If you have any questions, please feel free to contact me at (415) 744-1185 or Yvonne Fong of my staff at (415) 744-1199.

Sincerely,

Andy Steckel

Andrew Steckel
Chief, Rulemaking Office

cc: Harry Metzger, CARB
Kathy Diehl, EPA

PALMER ASPHALT COMPANY
196 WEST 5th STREET • P.O. Box 58
BAYONNE, NEW JERSEY 07002
Telephone: (201) 339-0855 • FAX: (201) 339-8320

March 6, 2000

Jim Nyarady, Manager
Strategy Evaluation Section
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, California 95812

Dear Mr. Nyarady:

I have your letter of February 25 inviting me to an Air Resources Board Workshop on March 16. I regret I will not be able to attend this meeting.

However, I would like to call your attention to my letter of December 6 as it concerns both bituminous coatings and bituminous primers. The subject of my letter, the proposed restrictive VOC limits, seems to have been totally ignored.

6-1

I find it especially unusual to see lower limitations for a primer than the subsequent coatings likely to be applied over the primer. I just don't understand how we can be expected to produce a primer with a heavier viscosity and, thus applied at a rate of application in excess of the surface coatings. It makes very little sense to me but then again, what do I know after 43 years in this industry!

Very truly yours,

PALMER ASPHALT COMPANY

Lewis S. Ripps
President

LSR/ed

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Telephone: (201) 339-0855 • FAX: (201) 339-8320

December 6, 1999

Jim Nyarady, Manager
Strategy Evaluation Section
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, California 95812

Dear Mr. Nyarady:

I have the communication of December 2 from Ms. Janette Brooks which enclosed the draft architectural control measure offered for our review. I would like to make the following comments.

6-2 With respect to the VOC limitations in the category of bituminous roof coatings the proposed 250 grams per liter limitation is precisely half of the limitation permitted in the recenlty adopted national EPA rule (500 grams per liter). In addition, it is substantially below the current 300 grams per liter limit which I believe is your current regulation. Reducing the VOC content in this particular line of product will result in a coating likely to be brittle and lacking flexibility normally associated with bituminous roof coatings. It will result in the application of a thicker film which would defeat the intent of lowering VOCs because more will be applied to the surface.

6-3 I don't believe our industry has done a very good job with respect to explaining the use of bituminous primers in the application of a wide variety of roof systems. This particular material is most often specified for conformance with ASTM D41. In order to conform to that ASTM designation most asphalt primers would probably require a minimum VOC content of 480-500 grams per liter. As the former chairman, and current vice chairman, of the ASTM sub-committee responsible for this particular standard I can tell you very honestly that this ASTM Sub-Committee has not been able to devise an asphalt primer standard that would satisfy your proposed low VOC requirements.

Here, also, trying to reduce the solvent content and develop a replacement to satisfy your proposed regulation would result in the application of a heavier film of product resulting in more solvent applied per square foot. In addition it would probably mean that the dry time for the primer would be delayed and that would result in an open and unprotected roof for an unreasonable and dangerous period of time. 6-3

The bottom line is that we are asking you to establish within your bituminous roof coatings category an exception for bituminous roof primers which should be permitted to have a VOC content of 500 grams per liter.

Thank you and respectfully.

Very truly yours,

PALMER ASPHALT COMPANY

Lewis S. Ripps
President

LSR/ed

Comment Letter 7

The commenter referenced material in a binder sent to the ARB on December 22, 1999. Some material in the letter and attachments is confidential, and is redacted.

FSC Coating

Coatings Engineered For Ultimate Performance

March 13, 2000

Mr. Jim Nyaradi, P.E.
Manager, Strategy Evaluation Section
California Environmental Protection Agency
Air Resources Board, Stationary Source Division
P.O. Box 2815
Sacramento, Ca. 95812

Subject: 1) Request For Response to Comments & Recommendations On Architectural Coatings Draft Rule
2) Evaluation For VOC Calculation Method Regarding Treatment Of Exempt Solvents

Dear Jim,

7-1 Having conferred with Greg Allen and Evan Wong, I am writing this letter to put on the official record my request for an official response from the Air Resource Board to my comments on the new draft rules. The topics that I have addressed are included in 1) my November 20th letter to you, 2) the outline from our September meeting and 3) the notebook I forwarded in January which included discussion and data sheets on each specific coating area warranting additional consideration.

7-2 In addition, I request review of the current method of calculating VOC and changes to include the exempt solvent inside the calculation equation. The problem is that I believe exempt solvents are unfairly treated in the calculation. By backing out water and exempt hydrocarbon solvents, the manufacturer is actually penalized for doing what the Air Resource Board wants him to do. I believe that the VOC calculation method should be altered to include the these exempt solvents in the calculation to give benefit to the manufacturer for doing the right thing and using more environmentally friendly solvents. In talking to Greg Allen, he had gone through the calculations also and found that even though we were using high percentages of exempt solvents in some our products, the current VOC calculation method yielded an artificially high value in comparison to the actual percentage of VOC producing solvent. It is very misleading as to actually what has been done to lower VOC emissions in each of the subject systems. This is particularly important to all water-borne systems, metal maintenance systems, urethanes & epoxies, acrylic lacquers for sealing masonry and high solids, quick dry varnishes.

7-3 Jim, I appreciate the willingness of the your engineering staff to look closely at the issues I have raised and consider alternative solutions that accomplish all of our goals. It continues to be refreshing to experience a high level of cooperation with our hope still being that the net result will be a better balanced rule resulting in benefits environmentally, lower costs to the end user and enhanced system performance. We feel this is the win-win solution that is needed.

I look forward to your response. FSC stands ready to help in any capacity that it can.

Sincerely,

Lawrence W. Cerenzie

Lawrence W. Cerenzie
Engineering Manager

[illegible]

FSC COATINGS, INC.
Coatings Engineered For Ultimate Performance

FEATURING:
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SEAL-KRETE Masonry and Concrete Sealers
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AMERICAN Industrial Coatings
ZERO-RUST Coatings
ALL DECK Systems

FAX COVER SHEET

TO: Jim Nyarady FAX#: ____________

COMPANY: ARB PHONE#: ____________

FROM: Larry Hardcopy To Follow? YES / NO

DATE: 3/13/2000 # OF PAGES INCLUDING COVER SHEET ____________

Dear Jim —

Attached is my "official request." Could you please cc: Greg & Evan?

Thanks
Larry

P.S. I cannot make March 16th meeting.

5360 Eastgate Mall, Suite "F", San Diego, CA 92121
FAX #: (858) 558-2159 PHONE #: (858) 558-0800

FSC Coatings

Coatings Engineered For Ultimate Performance

November 20, 1999

Mr. James Nyaradi, P.E.
Manager, Strategy Evaluation Section
California Environmental Protection Agency
Air Resources Board
Stationary Source Division
P.O. Box 2815
Sacramento; Ca. 95812

Subject: Follow-Up Information To Recent Coatings VOC Recommendations

Dear Jim,

Attached is the supporting information requested by your technical staff during our recent meeting in late September on the new proposed air quality rules. It was a pleasure to meet with the engineering staff to give our recommendations and support for those recommendations as well as to receive direct feedback from the people deeply involved in the rule making process.

7-4 The goal to achieve cleaner and healthier air is not only noble but a true benefit to all of the citizens of California. I believe that the recommendations and comments on the proposals are not only valid but will help to achieve that end when all factors are weighed and balanced.

It is worthy to note that many of the technologies that we discussed were developed for and used on San Francisco's famed PIER 39. It stands as our true test for water and solvent-borne systems alike that now are considered as "no known equals" -- even by public entities including the military.

Single Component – Simplicity That Leads To Higher Performance & Higher Compliance 7-5

In most cases our discussion will center on air dry, single component systems. The simplicity of this approach leads to **greater compliance with application instructions** and **less waste** or product loss as is associated with using multi-component systems. The adhesion of these systems to surfaces with less than perfect surface preparation are unmatched as is testified to in 1) the attached AKZO Laboratory letter after 2000 hours Salt Fog testing on smooth, brush finished bare steel (without sand blast) and 2) the attached [redacted] letter from [redacted] following over 2 ½ years of field and laboratory testing.

7-5 In my conversation this week with one of materials engineers from Ingalls Shipyard, they were having many problems using 2 component, mix-at-the-tip epoxies. The tremendous variation in adhesion because of the tremendous reactivity of these coatings BEFORE they reach the steel prevents the penetration into the surface matrix that is associated with slower reacting systems. **The problems associated with 90-100 solids systems must be recognized and considered – additional costs and losses with poor repairability are a given**. Increased surface preparation in terms of **deeper blast patterns** and **greater use of sand** (and the **disposal of these now "hazardous" residues**) must be considered from both the **pollution and additional cost perspectives**. Very few people are really capable of handling them. It is sad to say but it appears that some manufacturers, in an attempt to gain a competitive edge, are being less than honest regarding the drawbacks in application and expected longevity.

7-6 But another part to this thought process is that the **air dry, solvent-borne resins we use for steel and wood coatings** are made from **renewable resources** – certainly an issue in a world of declining oil reserves. The urethanes, acrylics and epoxies that generally would be used are all derived from crude oil. Certainly this difference is a critical issue if we are looking at the total impact of coatings in a resources consumed/environmental effect model that looks out 50-250 years.

Enclosures & Attachments

In each product class, I have presented my recommendations, data sheets, MSDS's and recommended VOC levels. In addition I have enclosed a list of people who have been involved in testing and evaluations of product performance with public and private backgrounds. The original discussion outline is included for a quick reference to the issues at hand and to assist with organizing the various areas. A table of contents is also included to assist the organizational efforts.

We look forward to solving these issues to the betterment of all involved. Please give me a call at 858-558-0800 for further discussion on these critical areas of coating technology.

Sincerely,

Lawrence W. Cerenzie

Lawrence W. Cerenzie
Engineering Manager

cc: Bill Reckel, AMTECO
Charles O. Grigsby, Zero-Rust

FSC Coatings

Coatings Engineered For Ultimate Performance

Comments On Proposed Air Quality Rule Changes From Recent Meeting

List Of Attachments & Enclosures

Section I. Air Dry Phenolic Alkyd Coatings As Superior Maintenance Coatings For Above Grade & Above Waterline Applications

1) Zero-Rust Product Brochure (Bridge Brochure)
2) Zero-Rust Standard Data Sheet (400 g/l)
3) Zero-Rust Military Data Sheet (275 g/l)
4) Akzo Lab Salt Spray Letter @2000 Hours on smooth, brush finished bare steel
5) Salt Spray Comparison Chart Of Zero-Rust vs. Other Maintenance Coatings
7-7 6) [redacted] Comparing Zero-Rust Performance To Current Multi-Component (Epoxy) Industrial & Automotive Primers
7) [redacted] -- Test Cards From Zero-Rust & SA-3 Applied To Rusty Steel
    A) 1600 Hour Weatherometer (92% average gloss retention with Ultimate "UV" Package; about 65% gloss retention with standard "UV" Package)
    B) Enviro-Cabinet (perfect adhesion at 1800 hours on rusty steel -- 50% immersion/50% QUV with varying temperatures)
    C) Humidity Cabinet (perfect adhesion with de-ionized water)
8) Sherwin-Williams Kem-Aqua Data Sheet With Salt Spray Results
9) Zero-Rust and SA-3 Application Procedure For Maintenance Applications
10) SA-3 Silicone Poly Plus Data Sheet
11) Amershield 2 Component Industrial Urethane Data Sheet w/ Direct & Reverse Impact Data
12) References As To Performance Of This Technology:
    A) Mark Nelson -- Senior Architect UCSD Facilities Design
    B) Norris Lindsay --NAVSEA Coatings Testing Laboratory

Section II. Acrylic Lacquers For Exterior & Interior Masonry Floor, Driveway, Warehouse and Roadbase Applications

1) AWR Super Sealer Data Sheet
7-8 2) [redacted]
3) [redacted]

FSC Coatings

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<u>Section III.</u> Floor Coatings – Urethane & Epoxy Coating Technologies (Incomplete)

1) General Polymers sample specs (note that lower solids primers are required for adhesion purpose)
2) (spec showing beadblasting or sandblasting required).

7-9 3) Bill/Don – Urethanes/Epoxies – performance comparison Molecular Wt vs. Solids?
Note: Jim we are still trying to locate an authoratative discussion on the molecular weight vs. VOC vs. Solids subject. Everyone in the urethane business will discuss it but will not put it down in writing for competive reasons – they want to talk about how they do in comparison to other suppliers products so as not to be hurt in the market place.

4) [redacted]

<u>Section IV.</u> Wood Stains

A). Published Natural Wood Finish, Stains and Preservative Test Data – including top 3 systems in each category.
   1) <u>Log Home Guide</u> Article
   2) <u>Log Home Construction & Maintenance Guide</u> 7-10
   3) <u>Preserving & Maintaining Wood Shakes & Shingles</u>
   4) Texas A&M letter on Maintaining Shake Roofs
      – water vs. Oil-based coatings – oil-based is the only type that works
      – only product recommended based on their testing is Radcon (TWP Shake & Shingle as ready-to-use coating system based on this technology).

B) TWP Product Comparison
C) TWP Product Data Sheets
   1) TWP 200 Series
   2) TWP 500 Series
   3) TWP 300 Series

<u>Section V.</u> Specialty Coatings (Graffiti Control)

A) Graffiti Max Data Sheet
7-11 B) <u>A-B-C's Of Graffiti Control</u> by Lawrence W. Cerenzie
C) [redacted] letter on Graffiti Max performance

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Section VI. Material Safety Data Sheets

A) Zero-Rust (VOC 400 g/l)
B) Zero-Rust (VOC 275 g/l)
C) SA-3 Silicone Poly Plus
D) AWR 2 & 3 Super Sealers – Acrylic Lacquers
E) New Quick Dry Lacquers (VOC 450 g/l)
F) TWP Shake & Shingle 200 Series (VOC less than 50 g/l)
G) TWP Deck & Furniture 300 Series (VOC 350 g/l)
H) TWP II 500 Series (VOC 350 g/l)
I) Graffiti Max

Section VII. Referrals For Paint & Coatings Performance & Use

A) [redacted]
B) [redacted]
C) [redacted]
D) [redacted]
E) [redacted]
F) [redacted]
G) [redacted]
H) [redacted]

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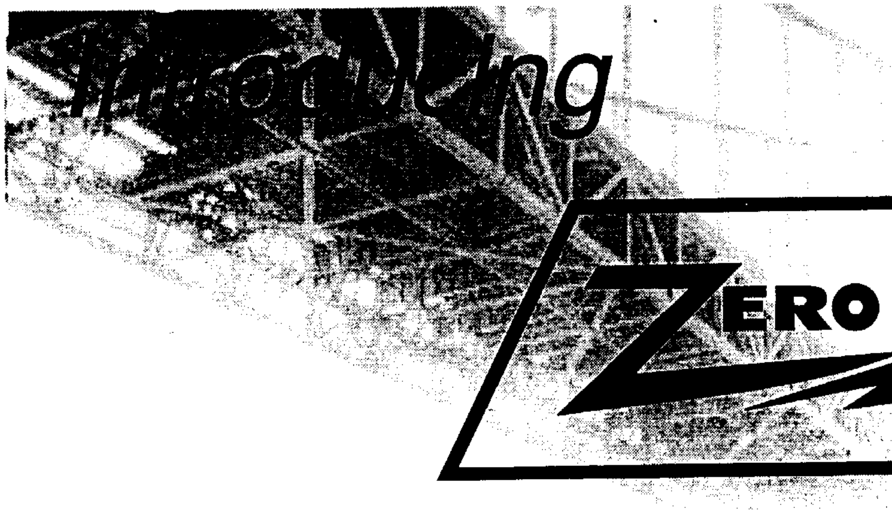

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- → Superior Protection Verified by Independent Salt Spray Testing.
- → Topcoat Not Necessary.
- → Single Component System.
- → Quick Dry — Tack Free in 1 Hour.
- → Environmentally Friendly — Free of Lead, Chromates & Barium.
- → Excellent Coverage Due to High Solids Content.

Outperforms the Competition

- Zero Rust dramatically outperforms all maintenance coatings, including DTM (Direct To Metal) and rust converter type primers

- 2400 hrs. (at 4.5 mils DFT) in the ASTM-B117 Salt Fog Testing without blistering or rust creepage (all other maintenance primers failed to reach 1000 hours with typical industrial coatings failing within 300 hrs. of exposure).

- No lift, blistering or rust creep after 2000 hr. Salt Fog over **RUSTY STEEL** (3.5-4.0 mil DFT over profile).

- Excellent High temperature resistance-up to 350°F (black only).

Penetrates & Controls Rust

- Zero-Rust Penetrates & Encapsulates Rust. Excellent over hand cleaned or tightly adhering rust.

- Perfect for general maintenance, with or without sandblast.

- New "Barrier Coat" Technology blocks moisture, salt & oxygen ions which cause rust. Strong Dielectric Properties insulate steel from electrolysis or galvanic corrosion.

- For Maximum Protection, use black or red oxide as a base coat (2.5-3 mil DFT). For marine or corrosive environments, apply 2 coats of black or red oxide (total 5-6 mil DFT) before topcoating.

Does Not Require a Topcoat

- Can be used as its own topcoat for a Matte-Satin finish. (Note: Zero Rust will eventually chalk in direct sunlight). Apply at 5-6 mil wet over Zero Rust basecoat.

- For High Gloss and Chalk Resistance, Zero-Rust can be top-coated with High Performance SA-3 Silicone Alkyd (excellent), standard enamels (acceptable) or 2 component urethanes (excellent).

Environmentally Friendly

- VOC Compliant at 398 gm/ltr or 3.3 lbs/gal. (Zero-Rust is also available in a 340 gm/lter or 2.8 lbs/gal version). Lower VOC formulas are special order.

- High solids formulation (63% solids by weight) provides excellent coverage.

- Does not contain barium, lead or corrosion inhibitors such as chromates.

Easy-To-Use

- Single Component - No mixing of parts and no "Pot-Life" worries with Zero-Rust.

- Simply stir and apply — Paint thinner cleanup.

- Airless sprayer, brush, or roller applied.

- Re-coat in 1 hour for spray and 4 hours for brush and roll. Available in spray cans for easy touch-up.

- Spread Rate: 5-6 mil wet over profile at 250-300 sq. ft./gal. (provides 2.5-3.0 mils DFT.) For maximum durability, apply 2 coats (5-6 mils DFT).

- Easy Maintenance/touch-up — Simply sand lightly and apply Zero-Rust.

Great For All Uses!

- **AUTOMOTIVE & AGRICULTURAL:** Auto Body, Trailers, Fasteners, Frames, Tractors, Farm Implements & Spreaders.

- **MARINE:** Boats, Barges, Docks, Piers, Railings, Metal Decks & Trailers. (Above water line only).

- **COMMERCIAL & INDUSTRIAL:** Tanks, Structural Steel, Piping (Black to 350° F), Pipe Supports, Decks, Bridges, Heavy Equipment, Benches, Rebar & Valves.

- **RESIDENTIAL:** Cars, Boats, Trailers, Metal Railings, Yard Equipment, Barbecues (black only), Shelving and Pool Equipment.

FSC Coatings, Inc.
5360 Eastgate Mall, Suite "F"
San Diego, CA 92121

FSC Coatings

Coatings Engineered For Ultimate Performance

Product Data Sheet

Zero-Rust®

VOC Compliant Phenolic Alkyd Primer Coating

Product Description:

Zero-Rust® is a truly high performance, easy to use, ferrous metal maintenance primer coating. **Zero-Rust®** field and lab performance is superior to that of all common maintenance primers, Water-borne DTM coatings, Waterborne epoxies and common maintenance epoxies in non-immersion applications. Independent testing has shown the single component **Zero-Rust®** to **exceed 2,000 hours ASTM B-117 Salt Spray testing over smooth, unprofiled surfaces with zero scribe creep** at 3-4 mils DFT (Dry Film Thickness). Similar results have been achieved over pre-rusted panels as well. Our Black **Zero-Rust®** has excellent high temperature properties (up to 350 degrees F) as evidenced by its use on geothermal plants, Vandenberg Missile Launch Facilities (Air Force) and on the shipboard missile hatch doors (U.S. Navy).

Great for application over **hand and power tool cleaned surfaces** as well as blasted surfaces. The composition is **free of heavy metals and does not pose environmental problems** should eventual removal of coating by sandblasting occur. Zero-Rust® is designed primarily as a barrier coating with special emphasis on water resistance and is free of conventional metallic rust inhibitive pigments. This product contains none of the components currently on the EPA banned list or future "hit list".

While we focus on the maintenance uses, **Zero-Rust® makes an excellent Original Equipment Manufacturer "OEM" coating** and is routinely used on **new trailers, new structural steel, new oilfield wellheads & manifolding, new mining equipment, new pump & manifold systems, new power generation skids and new tanks.**

Special Military Standard Formulation

Special Military Standard version for use by U.S. Military is available exclusively from FSC Coatings. This Zero-Rust® material will have special MSN's to identify its unique low VOC and much faster dry characteristics. These Military Standard coatings are currently being used by the U.S. Marine Corps and the U.S. Navy for maintenance applications on ships, vehicles, tools and equipment. The decision to use Zero-Rust® by the military follows almost 4 years of comparative military lab and field testing studies.

Common Zero-Rust Applications

Military Vehicles & Equipment
Barges & Ships
Seattle Port Authority
Water Treatment Plants
Tank & Bridges
Geothermal Piping (to 350°)
Offshore Platforms
Refineries & Pipelines
Oil & Gas Processing Equip.
Mining & Smelting Facilities
Vehicles & Trailers
Waste Haulers & Dumpsters
Fencing & Security Screens
Metal Buildings & Roofing
Power Generation Skids
Dump Trucks
Food Processing Plants
Piping / Structural Steel
Heavy Equipment Recoats

Minimal Surface Preparation Required

Excellent for application over hand tool & power tool cleaned surfaces with tightly adhering rust. Ideal for general maintenance when unable to sandblast. Incorporation of **Prep Step™** recommended in these instances to loosen rust for faster removal and to enhance surface adhesion. As with all coatings, grit-blasted or sandblasted surfaces will yield the maximum possible longevity.

Can Be Topcoated With Water-borne & Solvent-borne Systems For Exterior Uses And Corrosive Services -- Zero-Rust® may be topcoated with most generally available finish coat systems. For maximum longevity in high UV exterior exposures, we recommend the use of SA-3 Silicone Poly Plus™ and our family of "Super Urethanes". Time windows do exist for recoating Zero-Rust® with itself or other coating materials. Contact FSC for guidance as these windows vary depending on the type of coating and the carrier system involved. However, Zero-Rust® can always be recoated after full cure (5 days) by scuff sanding first to obtain a little "tooth" and then reapplying more Zero-Rust® or SA-3 Silicone Poly Plus™.

Zero-Rust® may also be recoated with the clear Crystal Coat® topcoat which has a boosted "UV" protection package built into the coating to protect itself and the underlying Zero-Rust® from damaging "UV" rays.

Product Performance Testing:

Zero-Rust® has exceeded 2,000 hours salt spray resistance over smooth, brush finished bare steel and pre-rusted panels with 0-1/64" of scribe creep -- unmatched primer adhesion performance. Similar results are achieved on pre-rusted steel panels. The Zero-Rust® performance exceeds that of commonly used red oxide, DTM Acrylics, water-borne alkyds and epoxies on these types of surfaces. Zero-Rust® performance has been confirmed by industrial, commercial, marine and military users. The longest test run to date was 2,450 hours in ASTM B-117 testing with zero scribe creep -- outstanding performance. Black and Red Oxide Zero-Rust® are recommended as the primers for corrosive services -- including marine, coastal and industrial surfaces.

Application: Airless, HVLP and conventional spray or brush and roll. Use 0.015-0.017 tip when applying with airless spray (smaller tip when spraying narrow or small parts). Remember, it takes 2-3 coats by brush and roll to equal one spray coat in dry film millage. Always follow safety rules associated with solvent borne, flammable products.

PHYSICAL PROPERTIES:

Weight Per Gallon:	10.80/lb	Viscosity:	74-84 KU
Non Volatile Veh :	34.39%	Non Volatile (wt):	68.73%
Non Volatile(vol):	53.60%	% Pigment:	34.34%

Dry Time: 5-6 mils wet--one hour set to touch at 70° F & 50% Relative Humidity when spray applied.

Recoat: 1 hour for spray at 70 degrees F and 50% Relative Humidity. Overnight for brush and roll.

VOC (Volatile Organic Content): Three VOC's are currently available depending upon your corporate needs and air control district regulations -- 275 g/l (Military Standard), 340 g/l & 400 g/l.

Spread Rate: 5-6 mils wet at 250-300 ft² per gallon per coat (theoretical). This spread rate will provide a minimum 2.5 mils Dry Film Thickness (DFT) over smooth profile. When applying over rough or profiled surfaces, additional coating will be required to achieve the minimum 2.5 mils DFT over the peaks or sharpest edges. All steel surfaces should receive a minimum of 2 coats of coating to achieve the desired resistance against moisture and salt penetration. This may consist of 2 coats of Zero-Rust®, or one coat of Zero-Rust® and one coat of desired finish. As in any situation where maximum corrosion resistance is required, experience has shown that a minimum of 5-6 mils DFT is required for extended longevity over steel substrates with blast or rust profile.

Reduction and Clean-up: No reduction is needed for airless spray. For conventional and HVLP sprayers, use ZR Thinner only. Clean-up with ZR Thinner.

ZERORUSTPDS–DEC 1999 Rev 1

Manufactured By: Amteco
Technical Information & Sales: FSC Coatings (fsccoatings.com) (800) 579-8459

FSC Coatings

Coatings Engineered For Ultimate Performance

Product Data Sheet

Zero-Rust® Military Standard

VOC Compliant Phenolic Alkyd Primer Coating

Product Description:

Zero-Rust® is a truly high performance, easy to use, ferrous metal maintenance primer coating. **Zero-Rust®** field and lab performance is superior to that of all common maintenance primers, Water-borne DTM coatings, Waterborne epoxies and common maintenance epoxies in non-immersion applications. Independent testing has shown the single component **Zero-Rust®** to **exceed 2,000 hours ASTM B-117 Salt Spray testing over smooth, unprofiled surfaces with zero scribe creep** at 3-4 mils DFT (Dry Film Thickness). Similar results have been achieved over pre-rusted panels as well. Our Black **Zero-Rust®** has excellent high temperature properties (up to 350 degrees F) as evidenced by its use on geothermal plants, Vandenberg Missile Launch Facilities (Air Force) and on the shipboard missile hatch doors and cannons (U.S. Navy).

Great for application over **hand and power tool cleaned surfaces** as well as blasted surfaces. The composition is **free of heavy metals and does not pose environmental problems** should eventual removal of coating by sandblasting occur. Zero-Rust® is designed primarily as a barrier coating with special emphasis on water resistance and is free of conventional metallic rust inhibitive pigments. This product contains none of the components currently on the EPA banned list or future "hit list".

While we focus on the maintenance uses, **Zero-Rust® makes an excellent Original Equipment Manufacturer "OEM" coating** and is routinely used on **new trailers, new structural steel, new oilfield wellheads & manifolding, new mining equipment, new pump & manifold systems, new power generation skids and new tanks.**

Special Military Standard Formulation With Military Applications

The **Zero-Rust® Military Standard Series** was developed to meet a lower mandated VOC emissions target as well as to be faster dry to allow quicker recoat times for faster field repairs. The **Cammy Tops™ Camouflage Topcoats** and **SA-3 Silicone Poly Plus™ with LSA** (Low Solar Absorption) pigments are designed to bond perfectly with the **Zero-Rust® Military Standard Coatings**. We recommend **Zero-Rust®** Black and Red Oxide as primers for all military applications because of their extended temperature use range, superior adhesion and superior corrosion resistance.

Significant to these formulations, dry to touch is normally 10 minutes or less at 70° F versus 20-25 minutes for our standard formulas. In addition, the **Zero-Rust® Military Standard** can usually be recoated within 30 minutes, which is less than 50% of the normal recoat window. Markedly improved recoat, cure rate and dry time properties are obtained without sacrificing performance--all important benefits to the military for infield and shop repairs.

Superior Performance In Military Applications When Compared to Other Mil-Spec Primers

In lab and field testing, **Zero-Rust® Military Standard** has been shown to outperform all other military specified primers on marginally prepared surfaces—the normal field and shop conditions. See letter dated October 1998 from Top Dlapa reporting on the Marine Corps 2 year Test Program where this performance is clearly documented. Easier and longer lasting field or shop recoats and coating repair operations are tremendous time and money saving benefits to all military users.

Product Performance Testing:

Zero-Rust® has exceeded 2,000 hours salt spray resistance over smooth, brush finished bare steel and pre-rusted panels with 0-1/64" of scribe creep -- unmatched primer adhesion performance. Similar results are achieved on pre-rusted steel panels. The Zero-Rust® performance exceeds that of commonly used red oxide, DTM Acrylics, water-borne alkyds and epoxies on these types of surfaces. Zero-Rust® performance has been confirmed by industrial, commercial, marine and military users. The longest test run to date was 2,450 hours in ASTM B-117 testing with zero scribe creep -- outstanding performance. Black and Red Oxide Zero-Rust® are recommended as the primers for corrosive services -- including marine, coastal and industrial surfaces.

Health Safety Benefits Over Other Mil-Spec Primers

Zero-Rust® Military Standard offers significant health safety benefits over all other high performance primers. Normally high performance in the coating industry indicates urethanes or epoxies which are known "body tissue reactive" materials and therefore cancer causing. The epichlorohydrins and isocyanates all react with water or –OH groups present in all internal & external body tissues. **Zero-Rust® Military Standard** does not contain any of these components – it is totally non-reactive to body tissues making applications safer, easier and less complicated. Field personnel can feel better about applying these materials knowing of their inherent safety to themselves and others--truly a win-win for everyone.

Common Zero-Rust Applications

Military Vehicles & Equipment
Barges & Ships
Seattle Port Authority
Water Treatment Plants
Tank & Bridges
Geothermal Piping (to 350°)

Offshore Platforms
Refineries & Pipelines
Oil & Gas Processing Equip.
Mining & Smelting Facilities
Vehicles & Trailers
Waste Haulers & Dumpsters

Fencing & Security Screens
Metal Buildings & Roofing
Power Generation Skids
Dump Trucks
Food Processing Plants
Piping / Structural Steel
Heavy Equipment Recoats

Minimal Surface Preparation Required

Excellent for application over hand tool & power tool cleaned surfaces with tightly adhering rust. Ideal for general maintenance when unable to sandblast. Incorporation of **Prep Step™** recommended in these instances to loosen rust for faster removal and to enhance surface adhesion. As with all coatings, grit-blasted or sandblasted surfaces will yield the maximum possible longevity.

Can Be Topcoated With Water-borne & Solvent-borne Systems For Exterior Uses And Corrosive Services -- Zero-Rust® may be topcoated with most generally available finish coat systems. For maximum longevity in high UV exterior exposures where topcoats are required, we recommend the use of SA-3 Silicone Poly Plus™, our family of "Super Urethanes", MaxLife™ Water-borne Acrylics or Cammy Top™ Topcoats. Time windows do exist for recoating Zero-Rust® with itself or other coating materials. Contact FSC for guidance as these windows vary depending on the type of coating and the carrier system involved. However, Zero-Rust® can always be recoated after full cure (5 days) by scuff sanding first to obtain a little "tooth" and then reapplying more Zero-Rust® or the appropriate topcoat from the above selection.

Zero-Rust® may also be recoated with the clear Crystal Coat® topcoat which has a boosted "UV" protection package built into the coating to protect itself and the underlying Zero-Rust® from damaging "UV" rays.

Application: Airless, HVLP and conventional spray or brush and roll. Use 0.015-0.017 tip to apply with airless spray (smaller tip when spraying narrow or small parts). Remember, it takes 2-3 coats by brush and roll to equal one spray coat in dry film millage. **Follow safety rules associated with solvent borne, flammable products!**

PHYSICAL PROPERTIES:

Weight Per Gallon:	10.80/lb	Viscosity:	74-84 KU
Non Volatile Veh :	34.39%	Non Volatile (wt):	68.73%
Non Volatile(vol):	53.60%	% Pigment:	34.34%

Ultra-Low VOC (Volatile Organic Content): 275 grams / liter

Dry Time: 5-6 mils wet—25-30 minutes set to touch at 70° F & 50% Relative Humidity when spray applied.

Recoat: 25-30 minutes for spray at 70° F and 50% Relative Humidity. Longer at lower temperature or higher humidity. Overnight for brush and roll.

Spread Rate: 5-6 mils wet at 250-300 ft² per gallon per coat (theoretical). This spread rate will provide a minimum 2.5 mils Dry Film Thickness (DFT) over smooth profile. When applying over rough or profiled surfaces, additional coating will be required to achieve the minimum 2.5 mils DFT over the peaks or sharpest edges. All steel surfaces should receive a minimum of 2 coats of coating to achieve the desired resistance against moisture and salt penetration. This may consist of 2 coats of **Zero-Rust®**, or one coat of and one coat of desired finish. For Naval or coastal uses where maximum corrosion resistance and longevity is required, experience has shown that a minimum of 5-6 mils DFT (2 coats of black or red oxide **Zero-Rust®**) is required for extended longevity over steel substrates with blast or rust profile.

Reduction and Clean-up: No reduction is needed for airless spray. For conventional and HVLP sprayers, use ZR Thinner only. Clean-up with ZR Thinner.

NSN Numbers: Although not assigned to date, the Marine Corps is arranging for NSN numbers to be assigned ASAP. **Zero-Rust® Military Standard** can be purchased using the following special Military Part Number Nomenclature.

Zero-Rust® Military Standard Part Numbers

	Spray Cans	1 Gallon Can	5 Gallon Pail
Black	**FMSZR20S**	**FMSZR20G**	**FMSZR20P**
Red Oxide	**FMSZR21S** (special order)	**FMSZR21G**	**FMSZR21P**
Grey	**FMSZR22S** (special order)	**FMSZR22G**	**FMSZR22P**
White	**FMSZR25S** (special order)	**FMSZR25G**	**FMSZR25P**

Below are special order items. Minimum order is 1200 spray cans or 50 gallons in 1's or 5's.
Not recommended for extended exterior exposures (without topcoat).

Cat Yellow	**FMSZR23S**	**FMSZR23G**	**FMSZR23P**
Green	**FMSZR24S**	**FMSZR24G**	**FMSZR24P**
Tan	**FMSZR26S**	**FMSZR26G**	**FMSZR26P**
Safety Blue	**FMSZR30S**	**FMSZR30G**	**FMSZR30P**
Safety Red	**FMSZR31S**	**FMSZR31G**	**FMSZR31P**
Safety Yellow	**FMSZR32S**	**FMSZR32G**	**FMSZR32P**

NOTE: For exterior use, it is recommended that the "black" or "red oxide" Zero-Rust® Military Standard be applied as a primer coat with the appropriate topcoat applied. Zero-Rust® will eventually chalk in direct sunlight. Zero-Rust® must be topcoated with our "UV" stable topcoats: SA-3 Silicone Poly Plus™, Cammy Top™ Topcoats, Super Urethanes or Maxlife™ Water-borne System to maintain proper color.

Manufactured By: Amteco
Technical Information & Orders: FSC Coatings at 800-579-8459 (fsccoatings.com)

AKZO NOBEL
Resins

Mr. William L. Reckel
President
Amteco Inc.

Dear Mr. Reckel:

Enclosed are the results from the most recent salt spray corrosion study on the "ZERO-RUST" products and experimental variations thereof.

Over the hundreds of panels checked over the last two years, it has become increasingly clear that dry film thickness is extremely important over bare steel. This last series of tests certainly meets your objectives of achieving 2000+ hour performance on smooth brush finished bare steel panels at 3.2 to 4 mil. dry film thickness one coat applications.

There were seven red oxide formulations, including the 28-60 Red Oxide "ZERO RUST" control. The results indicate continuing progress in optimizing performance characteristics within the framework of the basic barrier coat design. With the control designated as 28-60 #1, 28-80 #2,5,6,&7 show equal or better performance to 28-60 #1 Control at 2016 hours. As anticipated, the 28-60 #2 should be the final standard production item. Number 5,6 & 7 merely showed the ability to lower VOC's without sacraficing performance.

The two 28-62 Black "ZERO RUST formulations gave outstanding results at 2016 hours.

TEST RESULTS: ASTM B 117-63, 5% SALT SPRAY, 3-4 MIL. DFT on CRS.

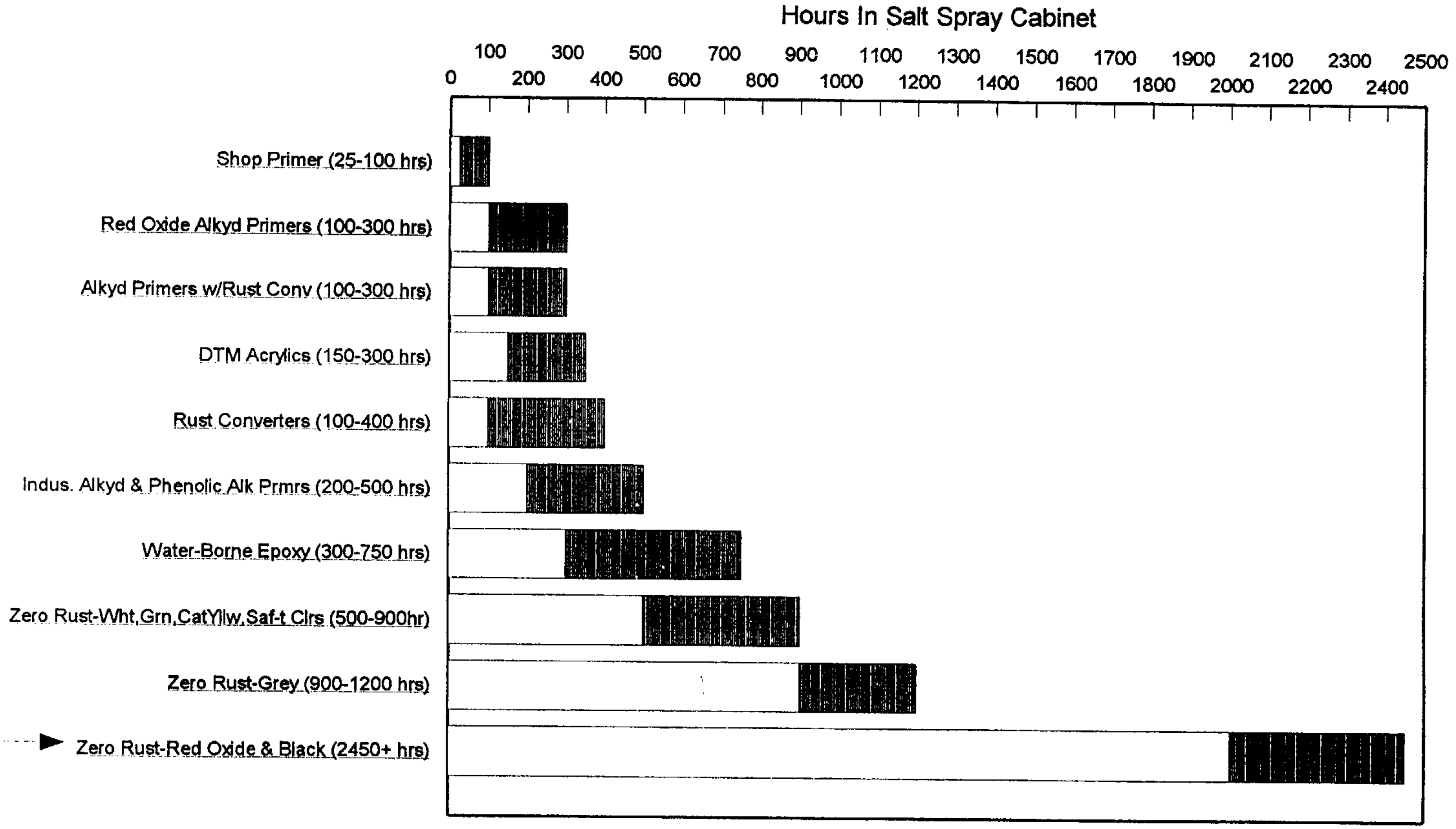
2016 hrs.	Field Rust	Field Blisters	Scribe Blisters/Creep	
Red Oxide				
28-60 #1	none	F #1	F#2	1/8"
28-60 #2	none	none	1#1	1/32-1/16"
28-60 #5	none	F#2 in corner	VF#2	9/32-1/4 "
28-60 #6	none	F#1	F#4	0-1/8 "
28-60 #7	.none	few top & bottom	F#4	0-1/64 "
Black				
28-62 #8	none	VF #1	F#2	0-1/64 "
28-62 #9	none	none	VF#6	0

Best Regards,

Don Gibson
Product Laboratory Manager

SALT FOG TEST RESULTS

Based on ASTM B-117 Salt Spray Testing



Zero Rust Tests performed by Akzo Nobel Lab on:
Sand Blasted, Smooth, & Pre-rusted Steel

[redacted]

4790
MMO
22 Oct 98

MEMORANDUM

From: Corrosion Control Officer , I Marine Expeditionary Force
To: Lawrence Cerenzie, Engineering Manager, FSC Coatings, 5360 Eastgate Mall Road,
Suite F, San Diego, Ca. 92127

Subj: ZERO RUST

1. For the past two years I MEF has conducting field testing of ZERO RUST for possible use in the Marine Corps, Corrosion Prevention and Control Program (CPAC), as requested by the CPAC WG. The products evaluated had to be user friendly , low VOC, environmentally compliant and resistant to the corrosive environment in which we deploy.

2. Initial test results have proven Zero Rust to be more reliable than the current 2 part primers applied at the organizational level. In an on going efforts to reduce the expenditure of our resources, yet maintain our equipment in the fleet while in garrison and deployed it was requested that FSC determine the feasibility of providing Zero Rust top / base coat in the standard cami patterns colors indicated below.

Color		Mil standard
Green	383	34094
Brown	383	30051
Tan	686	33446
Black		37030
Sea Foam Green		

3. The first color match samples when dried had too much sheen, minus Sea Foam Green but maintained the correct color and texture. Based on our last meeting these colors matches when produce are acceptable for use as a base coat in the organizational Corrosion control and the spot paint program.

4. The formulation of Zero Rust as a top coat must be addressed by different DOD activities due to the infra red and chemical resistance signatures required.

[redacted]

P.12

[redacted]

WEATHER-OMETER RECORD #3

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE SA-3 Zero Rust Silicone Alkyd
PRIMER: over Zero Rust Primer over Prep Step Treatment (Rusty Panels)
COATS: MLS:
CYCLE CAM USED: NO. 7
BLACK PANEL TEMPERATURE: 140° F (Black) White

SAMPLE # 4953
COMPLETED TEST #
START DATE 1/13/97
FINISH DATE 8/25/97
ACCEPTABLE: YES ☐ NO ☐

88% gloss retention

CONDITION	GLOSS	REFL	TIME METER READING			DAYS 10:1
			START	FINISH	HOURS	
	75	93				
Good Condition	67	93	5383	5783	400	250 Days
Very Slight Darkening	70	93		6183	800	500 "
" "	68	93		6583	1200	750 "
Slight Darkening	66	94		6983	1600	1000 "

START AND FINISH TIME RECORD
READING AT FINISH 6983
READING AT START 5383
TOTAL LIGHT HOURS 1600

FORM 366 4-90

[redacted]

WEATHER-OMETER RECORD #3

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE SA-3 Zero Rust Silicone
PRIMER: Alkyd
COATS: 2 MLS:
CYCLE CAM USED: NO. 7
BLACK PANEL TEMPERATURE: 140° F White

SAMPLE # 4945
COMPLETED TEST #
START DATE 1/13/97
FINISH DATE 8/25/97
ACCEPTABLE: YES ☐ NO ☐

91% glos retention

CONDITION	GLOSS	REFL	TIME METER READING			DAYS 10:1
			START	FINISH	HOURS	
	75	94				
Good Condition	68	94	5383	5783	400	250 Days
" "	67	93		6183	800	500 "
Ve " "	68	94		6583	1200	750 "
Very Slight Darkening	68	94		6983	1600	1000 "

START AND FINISH TIME RECORD
READING AT FINISH 6983
READING AT START 5383
TOTAL LIGHT HOURS 1600

T[redacted]

ENVIROTEST CABINET RECORD

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE SA-3 Zero Rust Silicone
PRIMER: Alkyd over Zero Rust Primer over Prep Step Treatment (Rusty Panels)
COATS: ______ MILS: ______
IMMERSION LIQUID ______ (White)
TEMPERATURE: ______

SAMPLE # 706 w/X
COMPLETED TEST # ______
START DATE 1/13/97
FINISH DATE 9/22/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	TIME METER READING START	FINISH	HOURS	SCR SETTIN(
Heavy Rust X - Slight Darkening	29970	30465	495	
" " - Slight-moderate Darkening		30873	903	
Heavy Rust - Moderate Darkening		31328	1359	
Heavy Rust X - Heavy Darkening		31801	1831	
↑ rust in scribe only - no lift or creep				

FORM 1391 R11/82

[redacted]

WEATHER-OMETER RECORD # 3

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE SA-3 Zero Rust Silicone Alkyd
PRIMER: over Zero Rust Primer over Prep Step Treatment (Rusty Panels)
COATS: ______ MILS: ______
CYCLE CAM USED: NO. 7
BLACK PANEL TEMPERATURE: 140°F (Black) White

SAMPLE # 4955
COMPLETED TEST # ______
START DATE 1/13/97
FINISH DATE 8/25/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	79 GLOSS	93 REFL	TIME METER READING START	FINISH	HOURS	DAYS 10:1
Good Condition	75	93	5383	5783	400	250 Days
Very Slight Darkening	76	92		6183	800	500 "
" "	79	92		6583	1200	750 "
Slight Darkening	76	93		6983	1600	1000 "

77% gloss retention

START AND FINISH TIME RECORD
READING AT FINISH 6983
READING AT START 5383
TOTAL LIGHT HOURS 1600

[redacted]

ENVIROTEST CABINET RECORD

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE 28-62 Zero Rust Primer
PRIMER: over PrepStep Gel Rust Dissolver
COATS: ______ MILS: 5-6 (Rusty Panels)
IMMERSION LIQUID ______
TEMPERATURE: ______ (Black)

SAMPLE # 701
COMPLETED TEST # ______
START DATE 1/13/97
FINISH DATE 9/22/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	TIME METER READING START	FINISH	HOURS	SCR SETTING
Surface Etching — Slight Fade	29970	30465	495	
" " — Moderate Fade		30873	903	
" " — Heavy Fade — Lt Rust @ Hole		31328	1358	
Moderate Alligatoring Surface — Heavy Fade — light Rust @ Hole		31801	1831	

FORM 1391 R11/92

[redacted]

ENVIROTEST CABINET RECORD

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE 28-62 Zero Rust Primer
PRIMER: over Prep Step Gel Rust Dissolver
COATS: ______ MILS: 5-6 (Rusty Panels)
IMMERSION LIQUID ______
TEMPERATURE: ______ (Black)

SAMPLE # 700 w/X
COMPLETED TEST # ______
START DATE 1/13/97
FINISH DATE 9/22/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	TIME METER READING START	FINISH	HOURS	SCR SETTING
Rust All X — Slight Fade — Surface Alligatoring	29970	30465	495	
" " — Moderate Fade — " "		30873	903	
" " — Heavy Fade — " "		31328	1358	
Heavy Rust X — Heavy Fade — Moderate Alligatoring on Surface		31801	1831	

FORM 1391 R11/92

Alligatoring — coating applied too heavy; passed submersion anyway

HIGH HUMIDITY RECORD

PRODUCT NAME: AMTECO ARCHITECTURAL COATINGS
PRODUCT DESCRIPTION: SA-3 ZERO RUST SILICONE ALKYD
NO PRIMER
PRIMER:
COATS: 2 MILS:
ACCEPTABLE: YES ☐ NO ☐
REMARKS:

ACTIVE SAMPLE #
COMPLETED SAMPLE#
INSTALLED: 9/23/97 REMOVED: 1/22/98
LENGTH OF TIME: 4 months

DATE	CONDITION
9/24/97	RUST 30% X- SURFACE GOOD CONDITION
9/25/97	RUST 35% X- "
9/30/97	LIGHT RUST 50% X- SURFACE GOOD CONDITION
10/6/97	LIGHT RUST 75% X- SURFACE GOOD CONDITION
10/15/97	" " " "
10/23/97	LIGHT RUST 90% X- DARK SPOTTING ON SURFACE
11/13/97	LIGHT RUST ALL X- " " "
11/24/97	" " " "
12/5/97	"
12/23/97	
1/5/98	NOT EVALUATED
1/12/98	RUST ALL X- SURFACE SPOTTING- SLIGHT DISCOLORATION

OVER

FORM 1396 7/91

no scribe creep, only rust in the scribe

HIGH HUMIDITY RECORD

PRODUCT NAME: AMTECO ARCHITECTURAL COATINGS
PRODUCT DESCRIPTION: 28-62 ZERO RUST PRIMER (OVER RUSTY PANEL)
PRIMER:
COATS: 1 MILS:
ACCEPTABLE: YES ☐ NO ☐
REMARKS:

ACTIVE SAMPLE #
COMPLETED SAMPLE#
INSTALLED: 9/23/97 REMOVED: 1/22/95
LENGTH OF TIME: 4 months

DATE	CONDITION
9/24/97	LIGHT RUST 70% X- SURFACE GOOD CONDITION
9/25/97	RUST 70% X- SURFACE GOOD CONDITION
9/30/97	RUST 75% X- " " "
10/6/97	RUST 80% X- " " "
10/15/97	" " " "
10/23/97	RUST 95% X- " " "
11/13/97	RUST 95% X- " " "
11/24/97	RUST 98% X- " " "
12/5/97	" " " "
12/23/97	" "
1/5/98	NOT EVALUATED
1/12/98	RUST ALL X- SURFACE IN GOOD CONDITION

OVER

FORM 1396 7/91

primer only has perfect adhesion on rusty steel

233-8373

SHERWIN WILLIAMS

CHEMICAL COATINGS

CC-A22

Kem Aqua® 70P Water Reducible Metal Primer

Black	E61B571
Gray	E61A570
White	E61W573
Red Oxide	E61R572

DESCRIPTION

Kem Aqua 70P Water Reducible Metal Primers are fast drying primers for general industrial use on steel either as a single shop coat or as the primer for Kem Aqua 280 Water Reducible Enamels. They offer VOC compliance, excellent corrosion resistance, early water resistance, and no flash point.

Advantages:

- VOC complying 2.8 lb/gal - low solvent emissions
- Fast air drying
- Excellent corrosion resistance
- Good early moisture resistance
- Excellent adhesion to untreated clean metal, both cold and hot rolled steel
- Reduces with water - means considerable cost savings in solvents
- Free of lead and chromate hazards
- No flash point - reduced fire hazards - possible lower insurance rates
- No critical recoat time when topcoated with Kem Aqua 280 Water Reducible Enamel
- Application by various spray methods
- Lower odor improves working conditions
- Water can be used for cleanup of spray guns and other equipment
- Complete water system with Kem Aqua 280 Water Reducible Enamels
- May be topcoated with solvent based air drying enamels

CHARACTERISTICS

Gloss: Flat

Volume Solids: 36 ± 2%
may vary by color

Viscosity:
as packaged
35-50 seconds #5 Zahn Cup
80-90 Krebs Units
reduced 7% with water
25-35 seconds #3 Zahn Cup

Recommended film thickness:

Mils Wet	3.0 - 3.9
Mils Dry	1.0 - 1.3

Spreading Rate (no application loss)
@ 1 mil dft: 580 sq.ft/gal

Drying (1.0 mils dft, 77°F, 50% RH):

To Touch:	30-45 minutes
To Handle:	60-90 minutes
Tack Free:	45-60 minutes
To Recoat:	30-60 minutes
To Pack:	overnight
Force Dry:	15-30 minutes at 150-180°F

Good air movement and humidity control are necessary for proper drying of water reducible coatings.

Flash Point:	none - Seta Flash
pH:	8.5 - 8.9
Package Life:	1 year, unopened

Air Quality Data:
Non-photochemically reactive
Volatile Organic Compounds (VOC)
as packaged, maximum, minus water
2.8 lb/gal, 336 g/L
reduced 10% with water:
2.8 lb/gal, 336 g/L

Volatile Organic Emissions
as packaged, maximum
1.6 lb/gal, 192 g/L

An Air Quality Data Sheet is available from your local Sherwin-Williams facility.

SPECIFICATIONS

General: Substrate should be free of grease, oil, dirt, fingerprints, drawing compounds, any contamination, and surface passivation treatments to ensure optimum adhesion and coating performance properties. Consult Metal Preparation Brochure CC-T1 for additional details.

Aluminum: If untreated, prime with Industrial Wash Primer, P60G2, or Kem Aqua Wash Primer, E61G520.

Galvanized Steel: If untreated, prime with Industrial Wash Primer, P60G2, or Kem Aqua Wash Primer, E61G520.

Steel or Iron: Remove rust, mill scale, and oxidation products. For best results, treat the surface with a proprietary surface chemical treatment of zinc or iron phosphate to improve corrosion protection.

Testing: Due to the wide variety of substrates, surface preparation methods, application methods, and environments, the customer should test the complete system for adhesion and compatibility prior to full scale application.

continued on back

APPLICATION

Typical Setups

Water reducible enamels must be applied at higher viscosities than solvent based enamels. They apply and atomize easier at higher viscosities. Do not over reduce.

Conventional Spray:

Air Pressure	50 psi
Fluid Pressure	8-12 psi
Cap/Tip	765/FF
Reducer	water
Reduction	as needed up to 10%

Airless Spray:

Pressure	1400-2500 psi
Tip	.011"
Reducer	water
Reduction	as needed up to 10%

Air Assisted Airless:

Atomizing Air	20-30 psi
Fluid Pressure	600-900 psi
Cap/Tip	.011" - .013"
Reducer	water
Reduction	as needed up to 10%

HVLP:

Gun	Binks Mach 1
Air Pressure	80-90 psi
Fluid Pressure	8-10 psi
Cap/Tip	#97P/91
Reducer	water
Reduction	as needed up to 5%

Dip:

Reducer	water
Reduction	25-35 seconds Zahn 3

a 3:1 blend of water and Butyl Cellosolve, R6K25 is necessary for tank maintenance. Monitor and adjust tanks for viscosity, pH (8.5-8.9), and stability. Excessive agitation or turbulence on part immersion or withdrawal may cause foaming.

Cleanup:

Use water when wet. If dried, clean with Butyl Cellosolve or MIBK.
Follow manufacturer's safety recommendations when using any solvent.

SPECIFICATIONS

Product limitations:

- Package stability is 12 months. Indoor storage at 35-95°F is recommended.
- Higher relative humidity will increase dry time.
- Do not spray at air temperatures below 45°F.
- Topcoat with Kem Aqua 280 Water Reducible Enamel or other water reducible air drying alkyd enamels. Do not topcoat with latex coatings.
- May be topcoat with solvent based alkyd enamels after 24-48 hours air dry.
- Liquid water reducible coatings may cause corrosion/rusting in the presence of steel. Tanks, containers, piping, and application equipment should be lined, stainless steel, or plastic.
- Heavier film thickness will give slower dry time and higher gloss. Follow recommended film thickness for optimum performance.

Performance Tests
Substrate: clean, cold rolled steel
Primer: @1.0 - 1.3 mils dft

Salt Spray Test	240 hours
Freeze/Thaw Cycles	4 cycles

CAUTIONS

Thoroughly review product label for safety and cautions prior to using this product.
A Material Safety Data Sheet is available from your local Sherwin-Williams facility. Please direct any questions or comments to your local Sherwin-Williams facility.

LABEL CAUTION

SEE CONTENTS STATEMENT ON LABEL.
VAPOR HARMFUL. Use only with adequate ventilation. Wear an appropriate properly fitted vapor/particulate respirator (NIOSH/MSHA approved) during and after application, unless air monitoring demonstrates vapor/mist levels are below applicable limits. Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
SPILL AND WASTE: Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. Contains Ethylene Glycol Monobutyl Ether which may cause blood damage.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN. FOR INDUSTRIAL USE ONLY. SEE MATERIAL SAFETY DATA SHEET.

Note: The information, rating, and opinions stated here pertain to the material currently offered and represent the results of tests believed to be reliable. However, due to variations in customer handling and methods of application which are not known or under our control, The Sherwin-Williams company cannot make any warranties as to the end result.

FSC COATINGS – Coatings Engineered For Ultimate Performance
Phone: (858) 558-0800 or (800) 579-8459 Fax: (858) 558-2159

Application Procedure For ZERO-RUST® Primer & SA-3 SILICONE ALKYD Top Coat

For NEW Structural Steel, Piping and Flat Steel Surfaces

1) **Commercial blast all metal surfaces** (including nuts & bolts) to remove rust, shop primers, slag, other contamination & mill scale. Apply **Prep Step® Concentrate diluted 1 part with 8 parts water** as a rinse to remove sandblast residue and to **"hold"** the blast pattern for coating.

NOTE: A) Complete penetration welds should be used to avoid pinhole formulation in the weld bead which can trap moisture under the coating system and cause extensive internal corrosion. B) Apply primer within 6 hours after sandblasting of steel to minimize surface rust (rose) formation if **Prep Step Gel Concentrate** is NOT USED. C) **SP-3 Power Tool Cleaning** can be used in conjunction with Prep Step Gel Concentrate for rust removal but is not recommended for mill scale removal.

2) **Surface must be clean** of all sand blast dust, dirt, oil, slag and mill scale prior to application of the primer. Use Degreaser to remove oil or grease contamination followed by a power wash. For areas that cannot be sandblasted or areas that have been aged after original sandblast, apply **Prep Step Concentrate** (full strength) to rusted areas, wire brush (wire wheel or other mechanical means) & scrape and flush grime from area with **Prep Step Concentrate** diluted 1 part to 8 parts water. Blow off dust and debris with dry compressed air (air dew point of 0 degrees F or less and oil free).

3) **Apply Zero-Rust® Black or Red Oxide primer** at 5-6 mils wet (2.5-3.0 mils DFT) over blast profile or 5-6 mils wet (2.5-3.0 mils DFT) over flat steel with airless spray equipment, brush or roll. **Strip coat all edges by brush** to ensure proper millage on edges following full coat application. When covering blast profile or rough surfaces, we recommend to spray two light coats with 1-2 hour cure (at 70 degrees F and 50 % relative humidity) between coats rather than 1 heavy coat for faster dry and cure. Brush or roll procedure will require 2-3 coats to achieve proper millage. Agitate coating to ensure proper mixing. Allow 1-2 hour dry before recoat with primer by spray and 4-6 hours when using brush or roll. **Must recoat within 5 days for proper adhesion and bonding.** Use wet mil gauge to check thickness during application. Use Xylol or **Zero-Rust Thinner** for thinning and clean-up. Normal product usage: 250-300 sq ft/ gallon with high product transfer efficiency over flat surface -- 200-250 over 1-1/12 mil blast profile; less in windy conditions with spray or if small diameter pieces are being coated (possibly 20-50% of normal coverage for 3" and 4" pieces). **For marine and other corrosive environments, we recommend 2-3 airless spray coats to achieve 4-6 mils DFT.**

Note: **It is always best to remove all old coatings before applying Zero-Rust® for maximum adhesion.** However, **if Zero-Rust® is applied over other primers or coatings, always sand the cured coatings with 150-220 grit sandpaper to facilitate adhesion.** Wipe or power wash sanding residue before coating. Do not use oily rags or recycled solvent in removal process.

4) **Apply SA-3 Gloss Silicone Alkyd Enamel as topcoat** at 5-6 mils wet (2.5-3 mils DFT). SA-3 can normally be applied in single coat by airless spray (if thinned, 2-3 coats); 2-3 coats necessary to achieve millage by brush or roll . **Strip coat all edges** to account for edge creep upon drying. For brush and roll, use mineral spirits for thinning. Use wet mil gauge to measure thickness during application. For conventional or airless spray, use Xylol,

VMP Naphtha or **Zero-Rust Thinner** (VOC Compliant) for thinning & clean-up. Set time is normally 2-3 hours. Recoat time 48-72 hours. Dries hard in 24 hours @ 2.0 mils dry film thickness. Normal product usage: 250-300 sq ft/gallon at 100% product transfer efficiency (for brush or roll); less in windy conditions with spray. Use frequent agitation during application.

Note: Zero-Rust® has a critical "recoat window" as it becomes very hard and impervious as it ages. Zero-Rust must be topcoated within 2 days when using waterborne or light solvent topcoats (light solvents include paint thinner, OMS or turpentine); within 5 days for strong solvent system coatings (MEK, Xylene, etc.). When topcoating Zero-Rust after these time windows, scuff sand surface to roughen surface for proper adhesion. When in doubt, always scuff sand. The time windows will be affected by increasing or decreasing temperatures and humidity.

5) If **bolts and nuts are not sand blasted; apply Prep Step Concentrate®** followed by wire brush for rust removal of entire surface and threads. If grease and oil present, solvent wipe or solvent soak (best) to remove oils or grease before applying **Prep Step**. Blow off dust and debris prior to application. Brush works good for thread applications of **Zero-Rust**. Bolts should be primed with Zero-Rust prior to installation if possible. Apply **SA-3** topcoat to threads & nuts after installation (thread and head touch-up with **Zero-Rust** may be necessary prior to **SA-3** application). Same millages as in Item 4}.

NOTES:

1) **When doing spaghetti steel** (1/2"-4" diameter piping or structural pieces), recognize that application rate may drop to 100-200 sq ft/gallon because of low transfer efficiency for both **Zero-Rust** primer and **SA-3** topcoat. Use of HVLP helps spray efficiency.

2) **Read all product data sheets before application.**

3) **Materials can be tinted with industrial or universal tint system** depending upon the system. **Recognize product and gloss life are reduced somewhat when industrial or universal tints are used** -- especially deep, safety and bright colors. Industrial tints are the better choice.

4) **Special primer formulations exist for quicker dry time and/or lower VOC** (as low as 275 g/liter) for volume users. Lower VOC formulations are also available for volume SA-3 users.

5) **VOC compliant solvents** for clean-up and thinning are available from FSC.

6) **Strip coat all edges** before applying full field coat to account for coating shrinkage or creep during the drying process.

7) If **Zero-Rust® is applied over mill scale or other contamination, adhesion loss can occur.** Removal of all contamination including flake or powder rust is recommended.

8) For **galvanized surfaces**, follow our specification for **coating previously uncoated galvanized steel**. Zero-Rust® must be modified for use on galvanize surfaces & special surface treatment such as GalvaPrep is involved.

9) **Zero-Rust can be topcoated with other high performance water-borne (Maxlife & Graffiti No More** Ultra Performance Acrylics) and **solvent-borne systems** (alkyd enamels, two component urethanes and epoxies) to achieve other properties or improve chemical resistance. Please contact FSC for special procedures. Recoat windows vary for these systems. (zrnewappl.doc--Dec 1999)

Orders & Technical Info: FSC Coatings (858) 558-0800 or (800) 579-8459

Manufactured By: Amteco, Inc.

FSC COATINGS – Coatings Engineered For Ultimate Performance
Phone: (858) 558-0800 or (800) 579-8459 **Fax: (858) 558-2159**

PRODUCT DATA SHEET
SA-3 SILICONE POLY PLUS™
SILICONE COPOLYMER ENAMEL (VOC COMPLIANT)

PRODUCT DESCRIPTION

The highest performance single component, silicone copolymer enamel available today based on independent testing. **SA-3 Silicone Poly Plus™** is a high solids gloss topcoat which meets or exceeds the performance standards of Federal spec. TTE-490E @ MIL E 24635A Type 1 @ 2. The **Silicone Poly Plus™** exhibits outstanding gloss and color retention, equal to or greater than many high solids, two component industrial urethanes. For a one component high solids finish with exceptional application properties, this is an extremely user friendly product for maintenance and architectural applications where long term performance is essential. Adhesion is excellent over a broad spectrum of previously painted surfaces including Kynar™ and Duranar baked coatings. Cured finish has superior adhesion as well as excellent direct and reverse impact resistance for direct to steel applications. Test results show that **SA-3 Silicone Poly Plus™** has greater reverse and direct impact strengths than common industrial urethanes. SA-3 is also available as MIL E 24635A Type 3 where a 2.3 lbs./gal. VOC may be required.

PRODUCT USES

Tanks, pressure vessels, well heads, truck bodies & frames, piping, hand rails, metal siding, railcars, transmission towers, implements, above water marine structural components, ships, barges, trailers, pumps, pallet racks, water treatment equipment and a variety of maintenance applications. For extended chemical resistance properties, the finish may be catalyzed with U-13 Aliphatic Urethane Prepolymer Catalyst. Product may be applied direct to clean metal for mild corrosive conditions for inside and exterior applications.

PHYSICAL PROPERTIES

WEIGHT PER GAL:	9.87 lbs.	VISCOSITY:	78-82 K.U.
FLASH POINT:	T.C.C. 104 P.	VOC:	351-410 gm/l.
WEIGHTS SOLIDS:	71% +-2	VOLUME SOLIDS:	56% +-2
60 DEG. GLOSS:	90+	DRY TIME @77°F:	S.T.- 2-3hrs.
DRY HARD:	24 HRS. @ 2.0 DFT.	DRY TO RECOAT:	48-72 HRS.

QUV Accelerated Weathering: >75-80% Gloss retention @ 500 hrs

APPLICATION & THINNING

Conventional, HVLP or airless spray. Brush, applicator pad or roll. Excellent appearance even when applied by brush and pad. Thin with ZR Thinner or appropriate FSC reducer.

SPREAD RATE

@400 ft^2/gal	4 mils wet film = 2.0 mils dry film
@280-320 ft^2/gal airless spray	5 mils wet film = 2.5 mils dry film

GLOSS

Standard is a mirror finish of 90-95 gloss; semi-gloss & satin sheens available in large batches at additional cost.

SURFACE

PREVIOUSLY PAINTED: Remove dirt, grease or surface chalk. Scuff sand with maroon Scotch-Brite pad and remove residue. Use Prep Step® to assist with loose rust removal. Prime rust spots with *Red* or *Black* phenolic alkyd "ZERO RUST"® primer. See FSC procedure for complete application procedure.

UNPAINTED NON-FERROUS METAL and METAL SURFACES: Check with your FSC Coatings technical sales representative regarding proper metal preparation and primer selection.

LABORATORY TEST RESULTS

The following data is a direct comparison of the old standard TTE - 490, 30% silicone/alkyd copolymer with our new silicone copolymer technology. The new resin allows for formulating to low level VOC's with good application properties and outstanding physical properties. All data is based on 1.5mm dry film thickness on B-1000 CRS after one week air dry.

		TTE-490 **Navy Haze Gray**	**SA-3** **Navy Haze Gray**	**SA-3** **White**
DRY TIME	:Set to Touch	1.25 hrs.	1.5 hrs.	1.5 hrs.
	: Tack Free	3.0 “	6.5 “	6.5 “
	: Hard Dry	4.0 “	6.5 “	6.5 “
	: Through Dry	4.0 “	6.5 “	6.5 “
HARDNESS	:Sward 24 hrs.	10	6	8
	:One Week.	24	14	18
QUV: Accelerated Weather UVB313/8 hrs. @ 60°C., followed by 4 hrs. of condensation at 40°C., 2 cycles/ 24hrs.				
Initial	60° Gloss:	93	93	89
	336 hrs.:	79/85%	82/88%	78/88%
	672 hrs.:	61/66%	61/66%	52/58%
	1008 hrs.:	35/38%	33/36%	34/38%
CLEVELAND HUMIDITY: Continous condensation at 100°F.				
Initial	60° Gloss:	93	93	89
	1008 hours.:	86	86	81
SALT SPRAY: ASTM B-117. @ 168 HRS.				
	Field	none	none	none
	Scribe blisters	dense #2	few #4	very few #4
	Scibe creepage	1/4"	1/8"	1/32"
DRY FILM PROPERTIES:				
	Hardness:	<2B	<2B	<2B
	Direct impact "/lbs.:	130 OK	160 OK	150 OK
	Reverse " “ :	50 OK	150 OK	135 OK
	1/8" conical bend	pass	pass	pass
	X-hatch adhesion:	5B	5B	5B

TEST RESULTS SUMMARY: In most cases the **SA-3 Silicone Polyester Plus™** properties exceed those of the original TTE 490E formulations and newer Navy topcoat systems. Other than slightly slower dry characteristics, the cured films have superior direct to steel adhesion and moisture resistance under salt spray conditions with improved impact resistance. The impact strengths are greater than most industrial urethanes—specifically the reverse impact strength which is the best indicator of long term adhesion is up to 100% greater with **Silicone Poly Plus™**.

Technical Support and Distribution: FSC Coatings (800) 579-8459 or (858) 558-0800
Manufactured By: Amteco, Inc.

Ameron®

Amershield™
Aliphatic polyurethane

Product Data

- Unique, high-solids, high-build, multifunctional coating
- VOC Compliant
- High-gloss, self-priming coating
- Excellent gloss retention
- Direct to metal and concrete
- Outstanding abrasion, reverse and direct impact resistance
- Good chemical and stain resistance
- Tough and flexible coating

Amershield displays high gloss; shows excellent color and gloss retention during extended service periods. The direct-to-metal capabilities of Amershield provide a single-coat system at reduced installation cost. Compatible over prepared, smooth cold-rolled steel and abrasive blasted hot-rolled steel.

Amershield has excellent adhesion to concrete providing a durable, glossy, easy-to-clean flooring system. May be used over Amerlock® as a durable, weather-resistant topcoat for extra heavy duty service; over zinc-rich epoxy coatings as a direct topcoat; over intact, old paint as a maintenance product.

Standard Amershield's drying and curing time may be adjusted with Amercoat 865 Accelerator for convenient application. A full color range is available in the Ameron Rapid Response color system to provide timely delivery.

Typical Uses

- Structural steel
  - Bridges
  - Marine
- Tanks
- Piping
- Industrial plants
  - Power
  - Pulp and paper
  - Food and beverage
  - Wastewater treatment
  - Chemical and petrochemical
- Concrete walls and floors
- Transportation
  - Rail car exterior and hopper lining
  - Vehicle equipment - buses, trucks, lifts
- Marine
  - Decks
  - Boottops
  - Topside and superstructures on ships
  - Barges and offshore platforms

Typical Properties

Physical

Impact resistance (ASTM D2794) @ 5 mils		
direct	140 in lbs	15.8 N m
reverse	50 in lbs	5.6 N m
Taber abrasion		
1 kg load/1000 cycles	weight loss	
CS-17 wheel	60.2 mg	
Elongation (ASTM D522)	≥32%	
Graffiti cleaning with Amerase with gloss retention	100 cycles	

Physical Data

Finish	Gloss	
Color	See Ameron color chart	
Components	2	
Curing mechanism	Solvent release and chemical reaction	
Volume solids (ASTM D2697 modified)	73% ± 3%	
Dry film thickness per coat	5 mils (125 microns)	
Coats	1	
Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)	1171	29
5 mils (125 microns)	234	5.7
VOC	lb/gal	g/L
mixed	2.2	264
mixed/thinned (1 pt/gal)	2.7	323
Temperature resistance (dry)	°F	°C
continuous	200	93
intermittent	250	121
Flash point (SETA)	°F	°C
cure	122	50
resin	110	43
mixed	115	46
Amercoat 65	78	25
Amercoat 12	0	-18

Qualifications

USDA – Incidental food contact
Tint and custom colors
NFPA – Class A

Application Data

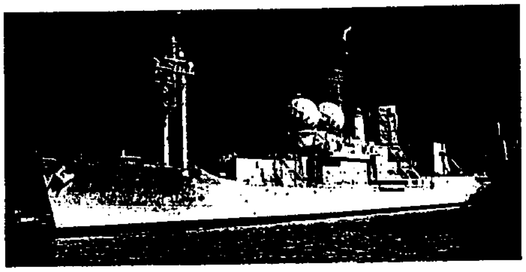
Applied over	Prepared steel, aluminum, galvanizing, masonry and primed concrete
Surface preparation	
steel	SSPC-SP1, 6 or 10
aluminum	Alodine®, Aluminprep® or light abrasive blast
galvanizing	Galvaprep® or light abrasive blast
concrete	See specific primer
masonry	ASTM D4261
primed surface	See specific primer
previously coated surface	SSPC-SP1, 3 or 7

Appearance will vary depending on substrate and application method

Mixing ratio (by volume) 1 part cure to 4 parts resin

Pot life (hours)	°F/°C		
	90/32	70/21	50/10
Amershield	$1\frac{1}{2}$	$2\frac{1}{2}$	5
accelerated with 865	$\frac{3}{4}$	$1\frac{1}{2}$	3

Using ½ pt Amercoat 865 per mixed 5 gallon Amershield



FACTOR 1

Unsurpassed performance

PSX 700 offers a longer service life than the traditional epoxy/aliphatic polyurethane system it replaces (see Figure 1, Service Life Projections). But when combined with an inorganic zinc primer (such as Ameron's Dimetcote 21-5 or 21-9), the 2-coat system significantly outlasts the best 3-coat zinc silicate, epoxy, polyurethane system. Here are just a few of the performance benefits offered by PSX 700:

- Gloss and color retention surpasses that offered by an aliphatic polyurethane (see Figure 2).
- Corrosion and chemical resistances exceed those provided by an epoxy coating.
- Adhesive strength of 2700 psi (on steel, using ASTM D4541) is more than double the 500-1000 psi offered by conventional epoxy coatings.
- Abrasion resistance is greater than or equal to a flexible aliphatic polyurethane and far superior to an ordinary epoxy (see table on back page).
- PSX 700 is highly resistant to stains, graffiti and dirt accumulation.

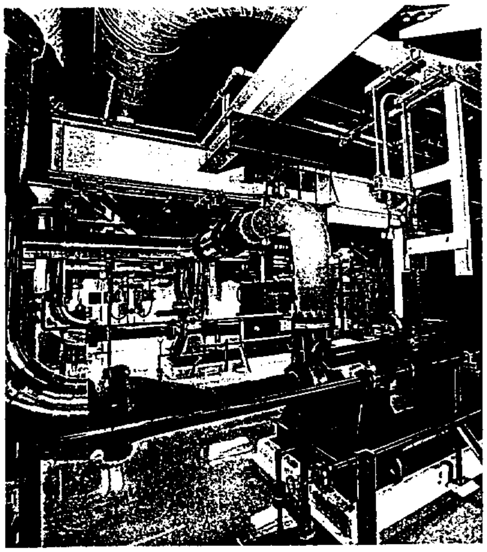


Figure 1

SERVICE LIFE PROJECTIONS

System	Number of Coats	Years of Service†		Conditions*
		SP-2/3	SP-5	
Epoxy/Aliphatic	[illegible]	[illegible]	[illegible]	Moderate
		[illegible]	[illegible]	Severe
PSX 700**	[illegible]	[illegible]	[illegible]	Moderate
		[illegible]	[illegible]	Severe

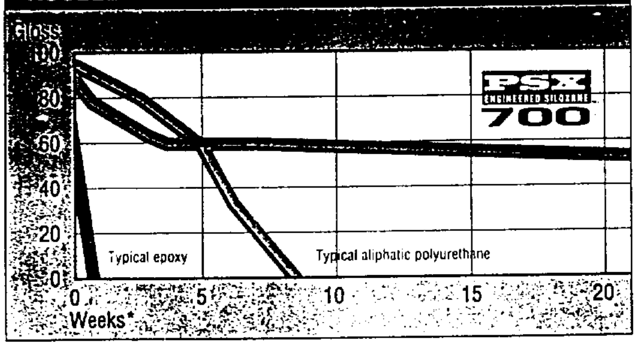
* Moderate = General industrial, no heavy fumes or fallout, 3 mils/year corrosion of steel.
Severe = Heavy industrial, heavy fumes and fallout, 3-6 mils/year corrosion of steel.

**Assumes, conservatively, a 30% improvement in performance.

† Reference NACE Paper #335.

Figure 2

ACCELERATED WEATHERING QUV TEST



* 1 week approximates 1 year of Florida exposure.

FSC COATINGS
(858) 558-0800 or (800) 579-8459

Product Data Sheet

AWR 2 & AWR 3 "Super Sealers"

Acrylic Lacquers in Satin or Gloss

Sealers for Concrete, Masonry & Aggregate Surfaces

Product Description—Voc Compliant

AWR 2 & AWR 3 Series materials are water clear 100% Acrylic solution surface lacquer sealers for exterior and interior use on concrete, masonry and aggregate surfaces. The resin has superior ultraviolet light resistance and does not yellow on exterior exposures. AWR is specifically designed for ease of maintenance due to its' ability to re-dissolve into itself when recoating after aging. The film has superior resistance to traffic and most water & solvent borne common chemicals. Properly sealed surfaces have excellent food stain resistance. AWR can be tinted with solvent tints and is available in satin, gloss, grey, black (for asphalt) and custom colors.

The AWR Super Sealer family repeatedly has been shown to be the highest performer of all the competitors in comparative testing. This testing includes uses for amusement parks (San Francisco's Pier 39), public roadways and regional shopping centers.

Product Uses

Decorative & uncolored concrete aggregate finishes, terracotta tile, interlocking pavers, concrete, block, interior & exterior concrete floors, brick, driveways, precast exterior aggregate construction panels, stone, stucco, asphalt and patio blocks.

Typical Projects

Driveways (asphalt & concrete), sidewalks, amusement parks, restaurant floors, hotel entries, parking garages, warehouse floors, loading docks, water treatment facilities, roadways (Highway 111 in Palm Springs), pool decks, stamped concrete surfaces and acid stained concrete surfaces.

Technical Data & Physical Properties	AWR 2-SAL	AWR 3-SAL
Weight per Gallon	10.5 -11.5 lbs.	11-13 lbs/gal
Flash Point	110°F	90-110°F
Non-Volatile Solids (VOL)	13-14.3%	18-20%
VOC (340 gm/l available on special order)	400-550 gm/ltr	400-550 gm/ltr
Solvent for Thinning & Clean-Up (VOC Compliant)	ZR Thinner	ZR Thinner

Technical Data		AWR 2-SAL	AWR3
Re-coat Time		2 to 4 hours	2 - 4 Hrs.
Dry Time	@ 77° F	30 Min.	30 Min.
Dry Hard	@ 77° F	1 - 2 Hrs.	1 - 2 Hrs.
Re-coat	@ 77° F	2 Hrs.	2 Hrs.

Clear and Colors

AWR Series Sealers in "satin" or "gloss" sheens are available in clear, grey and black. Special colors can be made for a nominal upcharge.

Surface Preparation

Remove dust, grease and oily deposits. New concrete surfaces should be aged 60 days minimum. Exterior concrete surfaces (particulary new) which are steel trowel finished, must be mechanically (example - blast track) or acid etched (acid must be neutrilized) to insure proper penetration & adhesion. The surface must be thoroughly rinsed (power wash is best) after etching & neutralizing to remove excess salts and debris.

Surface must be thoroughly dry for 36 hours. If moisture remains, white spots and/or disbonding may occur due to activation of the water repellant. White spots may normally be removed with an AWR Thinner application which redissolves the resin in preparation of another light AWR coat (sometimes 2 or 3 solvent treatments required). If white spots occur in heavy AWR build-up, sand off build-up down to substrate and reapply AWR. To be effective and prevent peel, AWR must penetrate into the masonry, concrete or asphalt matrix. Hard water deposits from landscaping water or regular hosings can leave a white film on surface.

Application

AWR Series Sealers are two coat systems. Best to spray or roll apply in thin surface wetting coats. The first coat is intended to penetrate deeply and should almost disappear into the substrate. Allow first coat to dry 2 to 4 hours. The second coat will re-dissolve the first coat and drive it deeper into the substrate. Do Not Leave Puddles On Horizontal Surfaces!!! A uniform light sheen should result after the second coat. A third coat may be required or desired if the surface is very porous (such as flat block, split face block or sandblasted surfaces). The porosity and temperature of the surface/substrate influence the amount of sheen and resulting surface wear characteristics. Porosity determines the amount of product required for each coat.

Equipment Application

AWR Series Sealers may be applied by spray, roller or brush.

1. Roller:Use 3/8" Pronell nap or standard 1/4" nap roller. Work out of a paint tray or pour AWR directly on to work area. Only work each area with a couple strokes--PENETRATION IS QUICK WITH FAST DRY! Curing on the roller means the area is being over worked. Work roller in front of the body, not side to side.
2. With AWR 2 -SAL, use spray application when surface temperature is above 90 °F.
3. Spray equipment must be compatible with Perchlorethylene, Acetone & Oxol 100 (Viton/Teflon & stainless steel parts).
4. Spray Applications: Use standard airless or HPLV equipment with a 50% overlapping stroke. Slight sheen will show after application. Uniformity of sheen will depend on the uniformity of porosity and application technique. Recommended spray tip and pressure: 0.017 - 0.019 (6501 - 6502) tip orifice @ 900 - 1200 psi.

Precautions:

1) Wear respirators when applying these materials. Do not smoke in area or apply near open flame due to flammability & hazardous combustion gases.

2) **ALWAYS APPLY AWR SUPER SEALERS TO TEST AREA BEFORE PROCEEDING WITH FULL APPLICATION. If AWR is applied in a heavy single coat, peeling, disbonding and premature wear patterns may result due to excessive surface build up. Do not apply to previously sealed surfaces other than AWR previously sealed surfaces, unless a test area is done before proceeding with AWR application.**

3) **AWR SUPER SEALER Is Not a waterproofing system. Water migration through stone or masonry surface can result in disbonding and efflorescence.**

Spread Rate

New Smooth Concrete Floors	**200-300 ft^2 / gal**
Old or More Porous Surfaces	**150-200 ft^2 / gal**
Stucco	**100-150 ft^2 / gal**
Very Porous Decking & Vertical Surfaces	**100-150 ft^2 / gal**
Concrete Pavers & Unsealed Block	**80-100 ft^2 / gal**
Split Face Block	**60-80 ft^2 / gal**
Polygrit Anti-slip Applications	**50-100 ft^2 / gal**

"Water Resistance Testing" is recommended. After 24 hours of cure, flood AWR Coated surface with water to ensure water seal. Mark dark areas (where water has penetrated). After 24-48 hours dry, apply AWR to marked areas and repeat test to ensure water seal.

Notes

1. **Though not a problem to date, it is possible that "hot" tire marks could be left in material in applications where vehicular traffic is present.**
2. **Tinted materials will require more frequent maintenance coats than clears**
3. **Allow test samples to age for 1 month for full evaluation**
4. **Where maximum traction is desired, incorporate "POLY-GRIT"™ non-slip additive @ 5-7 oz. by volume of "POLY-GRIT"™ per gallon of AWR. Mix "POLY-GRIT"™ into AWR and stir. Apply mix with roller. Apply 2-3 topcoats of AWR over base coat to hold the "POLY-GRIT"™. Yearly and bi-yearly maintenance is required on such applications.**
5. **Will not stop water migration or efflorescence from underneath the surface.**
6. **Negative side water and edge water migration (as from landscaping sprinklers) can cause white spots and/or lifting & peeling of AWR.**
7. **Consider PRIME & SEAL™ and SILOX SEAL™ for sidewall sealing applications because of their superior vapor transmission rates and "breathability".**

Thinning & Cleanup

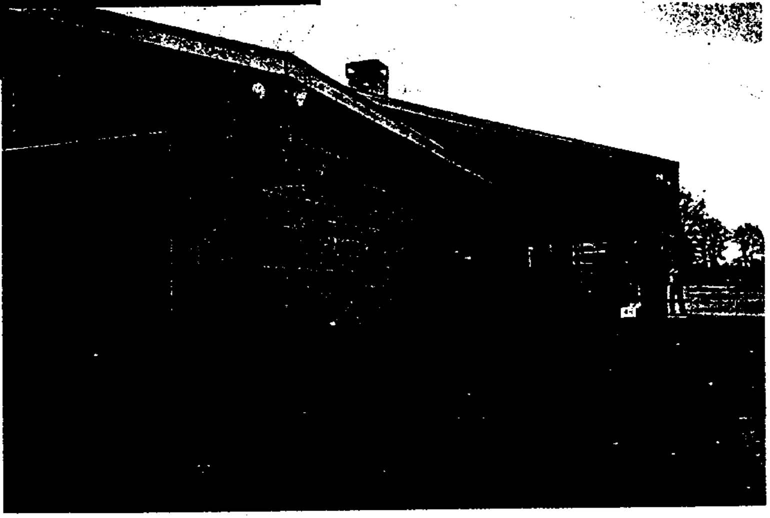
Thinning not required except during high temperatures. Thin with 1 qt. ZR Thinner (VOC Compliant) per gallon when surface temp exceeds 95 °F. Use ZR Thinner to clean equipment.

Manufactured By: Amteco, Inc.
Technical Information & Sales: Fiber Saver Coatings, Inc.
(858) 558-0800 or (800) 579-8459

BEFORE. Badly weathered logs and siding show graying and mildew prior to cleaning. A heavy pigmented finish would be required for covering, creating a painted look.

These two photographs courtesy of Weatherguard Systems, Inc., Marshall, Texas.

AFTER. Once cleaned, logs and siding have a light, uniform color, ideal for finishing.



Weathered, mildewed log homes can be cleaned and refinished to achieve a new look.

Beat the Weathering Problem

By CHARLES L. STAYTON
Extension Wood Products Specialist
Texas A&M University System

People who build or buy log homes obviously like the beauty of natural wood. Unfortunately, all natural wood exposed to sunlight and rain quickly weathers, turning gray. Mildew can also discolor wood, adding a blotchy-black to complete black discoloration. For example, unprotected log homes exposed to our East Texas climate often turn black within 10 months. Thus, most log home owners soon find they have a constant "battle on their hands" to keep their logs and other exterior wood looking natural and beautiful.

A recent study shows that almost 80 percent of homeowners prefer a natural to a weathered wood look. Log home owners who are aware that unfinished logs, wood siding, and trim turn gray apply stains, water repellents, varnishes, urethanes, clear finishes, linseed oil or various combinations of these for protection. They quickly discover that some don't control graying at all, others provide protection for just a few months, and most provide little or no mildew control.

Log homeowners not aware that wood weathers and mildews are quickly educated and soon resort to applying a pigmented finish, trying to regain the natural look. But, the gray, mildewed wood requires a heavy pigment to achieve a uniform appearance. The result is wood that looks painted. To achieve a new log home look requires that you clean the weathered, mildewed logs and other exterior wood first. This provides a clean, uniform wood surface for the new finish application.

Cleaning Weathered Logs

Weathered log homes are defined by their gray color or may be partially or totally black due to mildew. Cleaning provides a uniform light color which, when finished, gives your log home a new natural look. Cleaning is achieved by applying a chlorine solution or power water washing.

Chlorine solutions can be made either by mixing one part liquid laundry bleach (5 percent sodium hypochlorite) to an equal part water or mixing two ounces of granular, 65 percent calcium hypochlorite (used for swimming pools) to one gallon of water. You can apply the chlorine solution using an all-plastic garden pump sprayer or rent a commercial sprayer. (Chlorine solutions are corrosive and should not be applied with commercial sprayers unless internal parts are designed for such chemicals.) You should wear protective clothing, rubber gloves and eye protective glasses while spraying. (It is best to wear an approved respirator face mask, particularly if a commercial sprayer is used or there is a strong wind drift.)

The applied chlorine solution should be left on the wood 15 to 30 minutes and then rinsed thoroughly using a garden hose with a pressure nozzle. Adequate rinsing is achieved when only

TWP (1:1 blend of cedartone and dark oak colors) gives logs and trim a natural look while providing excellent weathering and mildew protection.

slight foaming occurs. Plants, flowers and grass can be protected by wetting them thoroughly with water prior to and after applying the chlorine solution.

If the logs or other exterior wood have algae, moss or lichen growth, it will usually require power water washing to remove them. If so, it may be best to clean the entire wood structure using a power washer. The pressure used depends on the degree of weathering and algae, moss and lichen growth. Usually, around 700 to 1000 p.s.i. will work, but some power washers have over 2000 p.s.i. capacity. You must be careful not to exceed the wood strength, causing splitting or breakage. It is best to start at a lower p.s.i. and slowly increase to the needed pressure. If the pressure is not adjustable, then the control is by the distance the spray wand is held from the wood. Power washers can usually be rented locally at rental supply companies for around $50 to $90 per day.

The cleaning process shows immediate results. The weathered, mildewed wood will be restored to almost the original color. This color is the final stage with power washing, but chlorine solutions bleach the wood to a uniform white color. Either process creates a clean, uniformly colored suface ideal for finishing.

Stains on wood siding and trim, caused by rusting nails, will not be removed by bleaching or power water washing. This unsightly problem could have been eliminated if hot-dipped galvanized, stainless steel or aluminum nails had been used. These stains can be removed using oxalic acid, but will reappear with continued nail rusting.

Finishing After Cleaning*

Cleaned logs and other exterior siding and trim must be finished. Otherwise, the weathering process will once again turn the wood gray. You should allow the cleaned logs and other exterior wood to completely dry before applying a finish.

Finishes that provide an attractive, mildew free appearance for more than two years are limited. Weathering tests conducted by the Texas Forest Services' Forest Products Laboratory show that most natural wood stains and water repellents last only 7 to 18 months before mildew and weathering begin. These test results tell us that the new finish you apply must be pigmented to keep the wood looking natural. The pigment must be high quality so that it compliments rather than masks the wood. The finish must contain preservatives to control decay and mildew fungi. A wood penetrating water repellent and ultraviolet light absorber will help the finish to maintain a good appearance. The finish should penetrate into the wood rather than form a surface film. (Surface films will eventually crack and peel, requiring scraping and sanding before refinishing. Such refinished surfaces never look natural.) An outdoor finish should not contain a high linseed oil content because it can become a mildew problem.

Only three finishes tested in Texas offer the log home owner a natural look for 2 to 5 years before refinishing is necessary.

TWP, a total wood preservative, has shown excellent results on wood siding test samples and accelerated tests on spruce logs. It contains both a fungicide and mildewcide, as well as a pigment, resin, ultraviolet light absorber and water repellent. TWP is ready-mixed and available in cedartone, redwood, dark oak, walnut and barnwood colors. It provides maximum mildew control and keeps wood looking very natural for 3 to 5 years. Refinishing is necessary when mildew appears or pigment breakdown starts.

TWP can be brushed or sprayed and should be applied to saturation (until it begins to run). For logs, it is best to apply one coat, let dry and flood surface with water. Locate and caulk any leaks through logs, allow to dry, and then apply a second coat of TWP. For wood siding and trim, one coat of TWP is sufficient.

Cunapsol 5, a water soluble copper napthenate concentrate diluted 1:4 with water, can be used to finish log homes. We have tested it on regular wood siding and shingle roof weathering samples and applied it to two cedar siding homes and several fences as result demonstrations. It imparts an initial green color which weathers to a cedar brown. It is best to pigment the ready-to-apply solution with brown

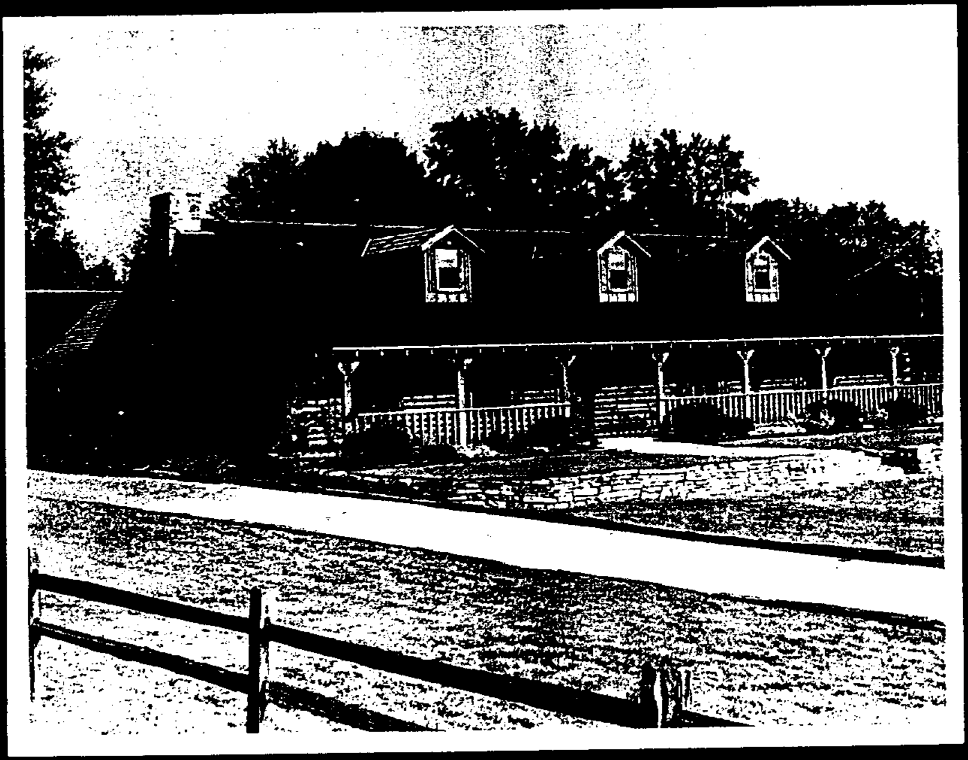
(please turn to p. 51)

Cunapsol 5, diluted 1:4 with water and pigmented with brown iron oxide, lightens to a cedar brown color and provides good protection.

Sikkens, a multi-coat system, gives a natural look, but forms a surface film subject to cracking when fully exposed after 2 to 3 years. *(Editor's note: No log surface should be fully exposed. Logs should always be protected from the weather.)*

**Finishing information recommendations are based on tests and result demonstrations performed primarily in East Texas. The opinions given should in no way be interpreted as an official endorsement by the Texas Agricultural Extension Service or the Texas Forest Service, both of the Texas A&M University System.*

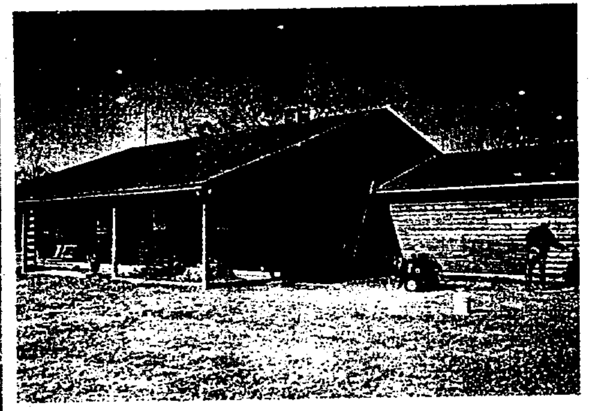
Log Home Construction & Maintenance



(CCA pressure-treated logs can be finished after they have weathered for 6 months in an exposed location or 1 year in a protected location such as under a covered porch.)

The finish should protect against weathering (sunlight and rain), decay and mildew. (CCA treatment protects logs from decay, but not mildew.) The finish also must contain a pigment if the homeowner wishes to maintain the original wood color or mask the greenish color of CCA treatment.

Weathering tests conducted by the Texas Forest Service's Forest Products Laboratory show that most wood stains, water repellents and preservatives last only 7 to 18 months before mildew or weathering begins. Most log home owners report that they are refinishing annually to maintain the original wood color.



Continual maintenance is essential in order to prevent problems caused by weathering, mildew and wood decay.

One product tested in Texas and Missouri has proved effective in controlling both weathering and mildew. It is TWP (Total Wood Preservative). TWP contains both a fungicide and a mildewcide, as well as a pigment, resin, ultraviolet light absorber and water repellent. The TWP finish lasts about 5 years and may be the best way of maintaining an attractive natural wood look.

Seal Treat II is another product which gives a long-lasting finish. However, it is only available in a clear, ready-to-use solution and is not effective in maintaining the original color of wood. Wood treated with Seal Treat II weathers to a pleasing ash-white color. This product controls mildew well.

Sikkens, a product which must be applied in multiple coats, has shown acceptable results for shorter periods of time. It tends to break down under ultraviolet light within 2 to 3 years, and does not protect against mildew for very long in hot, humid climates. Although the initial cost of Sikkens is high when compared to other products, its coverage rate tends to compensate for the cost difference.

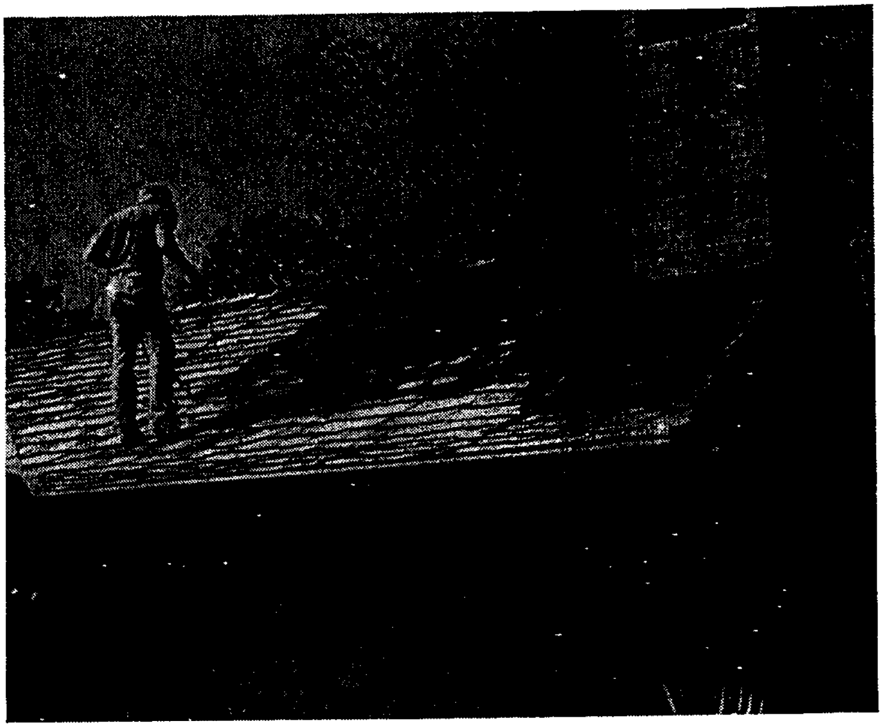
Controlling Decay and Insects in Existing Log Homes

Owners of log homes often experience wood decay and insect problems. The most common insect problems are caused by beetles which attack the wood within days after trees are felled or as logs are dried, machined or transported. These beetles include: the metallic wood-boring beetles sometimes referred to as flatheaded borers; long-horned wood-boring beetles or roundheaded borers; ambrosia beetles and pin-hole borers; and powderpost beetles and old house borers.

The beetle larvae most often found in homes constructed of softwood logs are metallic wood-boring beetles. The adults lay eggs in bark cracks and crevices of unseasoned logs. The larvae feed deeper into logs as the wood gets drier, and emerge as adults within 1 to 5 years after house construction. The 1/4-inch to 3/8-inch oval holes they leave upon emerging can trap water in the insect tunnels, causing decay. These emergence holes should be sealed with polyurethane caulking. No treatment for these beetles is required.

Powderpost beetles and old house borers infest wood after debarking and during seasoning, storage, transit or construction. The adults emerge 3 or more years later and can then reinfest the wood. Therefore, emerging beetles must be identified so that appropriate control methods can be used. These methods include spraying or injecting the logs with an EPA-registered insecticide or, in certain cases, fumigating logs under a gas-tight tarpaulin. Both of these control methods will require the services of a certified pest control operator.

Subterranean termites can pose a serious threat to log homes; that is why homeowners are strongly advised to have the soil properly treated prior to or during construction. If termites attack logs after the home is built, the damage can result in substantial labor and repair costs. Also, it is much more expensive and difficult to treat the



After power washing and repairing this red-cedar roof, a worker applies a wood preservative, which will keep it free of mold, lichen, and decay for up to five years.

RESTORING and TREATING WOOD SHAKES and SHINGLES

Double or triple the service life of a cedar-shingle roof by power washing and treating

by Brian Buchanan

Dating back to the earliest days of colonization in North America, cedar shakes and shingles have offered strength, durability, insulation, and beauty to our homes. A wood roof imparts a look of quality that few other roof coverings can match.

Only a few years of exposure to the weather, however, can drastically change this "quality" roofing. Through the interaction of sunlight and rainfall, cedar shakes and shingles can lose virtually all their natural preservatives in as short a time as five years. At this age, most cedar roofs begin to show signs of cupping, curling, splitting, and decay.

Unlike most roofing materials, however, cedar shingles and shakes can be restored and maintained through proper care and treatment, often doubling or tripling the remaining service life.

Why Wood Roofs Weather

Western red cedar is an extremely durable material even under adverse conditions, but its useful life depends upon the environment. Cedar roofs left unprotected suffer photodegradation by ultraviolet light (sunlight), leaching, hydrolysis, shrinking and swelling by water, and discoloration and degradation by decay microorganisms.

Photodegradation by sunlight. Solar radiation is the most damaging component of the outdoor environment. Photodegradation due to sunlight occurs fairly rapidly on the exposed shingle surface. The initial color change from the golden, orange-brown color to gray is related to the decomposition of lignin in the surface wood cells. (Lignin is Mother Nature's way of holding wood cells together.) The wood cells at the shingle surface lose their strength and eventually are washed away by rainwater. In addition, microscopic cracks and checks develop, allowing deeper water penetration.

Degradation by moisture. Accompanying this loss of wood fiber at the shingle surface are the shrinking and swelling stresses set up by fluctuations in moisture content. These stresses cause deeper checks and splits to develop. The result: shakes and shingles begin to cup, curl, split, and check at an accelerated rate.

Degradation by wood-destroying

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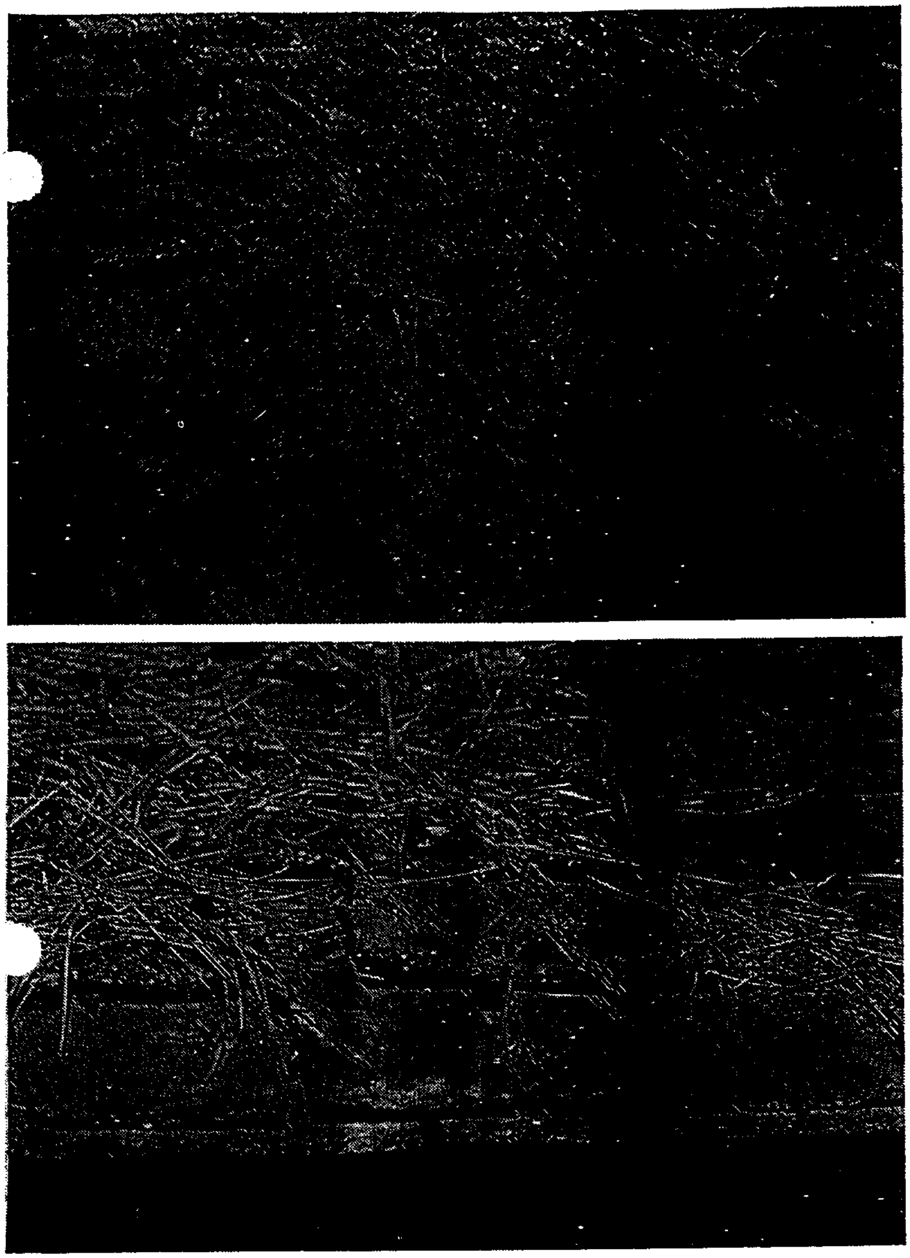


These 14-year-old untreated shingles (top) in the humid Houston area ***show severe*** *decay, splitting, and heavy accumulations of moss and lichen. Organic debris left on the roof (****bottom****) traps moisture and hastens decay.*

fungi. The natural decay resistance of western red cedar is due to its heartwood extractives, including the *thujaplicins* and a variety of *phenolic compounds.* The thujaplicins contribute to the decay resistance of red cedar while the phenolic compounds and resins give cedar its water repellency and *lubricity* (slippery surface).

Since the natural preservatives in cedar are somewhat water soluble, they can be depleted in service. In roof exposure, extractives may leach out in a relatively short time and allow colonization by wood-inhabiting fungi. Added by favorable climatic conditions, these in turn allow the growth of wood destroying fungi, which ultimately cause the early failure of a roof. The wood becomes soft and spongy, stringy, pitted, and cracked or crumbly. This usually occurs first at the butt region of the shingles where they overlap.

An added factor is that more shakes and shingles are being manufactured today from younger, less decay-resistant cedar since old, high-thujaplicin-content logs are no longer readily available. This shortens the roof's life expectancy even more.

How fast a wood roof weathers is a function of slope, direction, and shading. The shallower a roof is, the more likely it is to suffer decay from fungi. South-facing slopes suffer because they experience the greatest swings in temperature and humidity—leading to more splits and other degradation. Shade is also a concern. Wood roofs shaded by trees are more likely to develop mold, mildew, and decay than unshaded roofs.

Shake and Shingle Quality

Grade No. 1 (Blue Label) shingles and shakes in the past were cut from 100-percent clear, vertical-grain heartwood. However, grading standards have been relaxed over the years allowing more flat-grain and defects. These shakes and shingles are particularly susceptible to cupping, curling, and splitting. Improper nailing, nailing too high or too far in from the edge, only worsens the problem.

To Repair or Not

The older the roof, the more difficult it is to repair satisfactorily (see "Repair Procedures"). Although you can salvage a roof that requires as many as 30 repairs per square, it may not be cost-effective. A good rule of thumb is that shingle roofs older than 20 years, and shake roofs older than 25 years, will be extremely difficult, if not impossible, to

Repair Procedures

Replacement. One common way to spot-repair demaged or decayed shingles is merely to replace them with new ones.

Tools required for shingle replacement are: roofing hammer, metal hacksaw blade or heavy wire cutters, a wood block, a nail set, shingle nails (hot-dipped galvanized), and new No. 1 grade shingles or shakes.

The replacement of a shingle or shake can be completed in seven easy steps:

1. Split the old shingle using the blade end of the roofing hammer, in line with the original attachment nails.
2. Then remove the broken shingle with the serrated head of the roofing

hammer.

3. Saw or clip off the nail heads left just under the butt of the overlapping shingle.

4. Then drive a new shingle into the void until the butt is within approximately one inch of the butt line of the adjacent shingles.

5. At this point, toenail two nails (which should be about ½ inch longer than the original nails) through the shingle up under the overlapping shingle at a 45-degree angle.

6. Complete driving of the nails, using the nailset to avoid damaging the shingles.

7. After setting the nails, drive the shingle in by striking the wood block held against the butt of the shingle, until the butt of the new shingle is even with the shingle course line.

The entire process generally takes about five minutes to complete. *Under no circumstances* should new shingles be "facenailed" leaving the nailheads exposed. When face nailing, the nails tend to extrude and the shingles tend to crack through fastener holes in the weathered surface.

Repeated wetting of shingles causes them to swell, grabbing the nails and raising them. As the shingles dry, the wood shrinks, leaving the nails elevated. Over time, this can cause loose shingles and lost nails. In addition, as the wood ages, it tends to shrink, causing holes to enlarge, and leaving the nails loose in the nail holes.

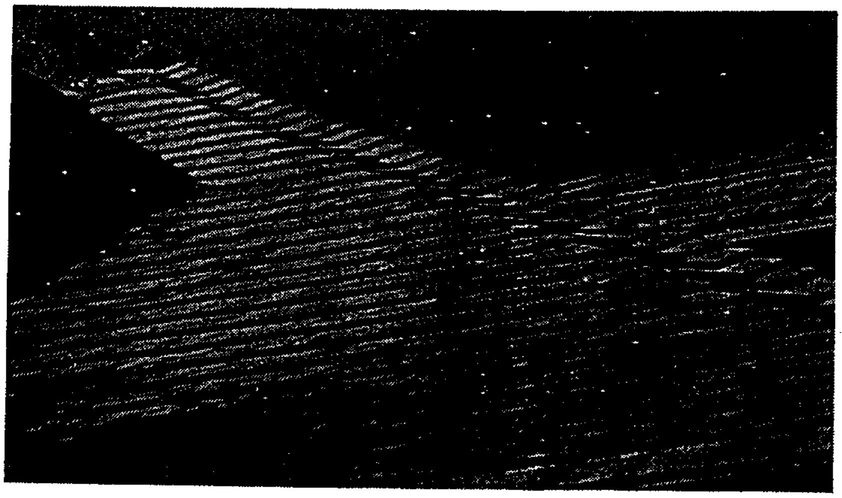
One problem with removing damaged or decayed shingles is that surrounding shingles can be loosened or broken.

Undershimming. Another method of spot repair, especially on older and more weathered roofs, is "undershimming." Undershimming involves placing a waterproof shim under the damaged shingle. Recommended shimming materials are heavy 45-pound roofing felt, aluminum, or galvanized sheet metal.

Undershimming is easily accomplished. With a claw hammer, the shingle is raised, and a 4x8-inch shim is slipped in under the shingle. Friction between the wood and the asphalt-impregnated felt is sufficient to hold the felt shim in place. Metal shims have either a rough burr on the surface, or the lower corners can be bent down to bite into the wood to hold the shim in place. The shim should not be visible after installation. Obviously this technique is only suitable when the shingles or shakes are split and not decayed or loose. This technique is faster and less expensive than replacing individual shingles and it doesn't disturb surrounding shingles.

Any wood roof that requires more than 30 repairs per square, such as this one, is probably not worth restoring. Shingle roofs over 20 years old and shake roofs over 30 may be too far gone.

Perma-Pine Shakes Are Here: Move Over, Red Cedar



Pressure-treated pine shakes will weather to an attractive buckskin tan—the same color as pressure-treated wood—regardless of climate.

Many home buyers choose cedar shingles for their natural decay-resistance as well as their beauty. In some regions of the country, cedar roofs can last 50 years or longer. In warm, moist areas, however, the rvice life of a wood roof rarely exceeds 15 years due to decay, curling, and splitting.

In addition, the future availability of good quality cedar shakes and shingles to the U.S. builder is in question. The timber supply in the Northwest is depleted and four-hundred-year-old trees take time to replace. So to meet consumer demand, in 1977, the Texas Forest Products Laboratory began research aimed at developing southern-yellow-pine shakes that would have the advantages of cedar, but be more durable, stronger, and best of all, more affordable.

Developing Grade Rules

Preliminary work centered around developing grade rules for manufacture. Early in the study, the group determined that it was not feasible to produce a handsplit-sawn pine shake, due to the prev nce of knots and irregular grain. They decided to concentrate on *sawing* shakes with butt widths of greater than ⅛ inch. These are called "taper-sawn shakes."

Literally thousands of pine shakes of varying dimensions were exposed to both long-term and accelerated testing. The first complete pine roof (3,000 square feet) was installed in 1979. The shakes used were nearly all quartersawn, but were allowed to contain all types of defects—knots, pitch pockets and crossgrain—to aid in developing grading rules. After one year, the roof was inspected. As expected, there was considerable splitting in those shakes with large percentages of "flat grain." This problem was solved by limiting the amount of flat grain and keeping it away from the center of the shake. Most of the problems encountered with the shakes on that particular roof were related to one or more of the following:

- Shakes too wide (over 8 inches)
- Presence of large, exposed knots
- Excessive flat grain
- Non-uniform butt thickness
- Density less than four rings per inch

Since then, the Forest Service covered 14 more office-building roofs, bringing the installed area of pine shingles up to about 65,000 square feet. Based on results from both accelerated- and long-term exposure testing, the Forest Service developed a set of manufacturing specs for pine-shake mills to follow.

Preservative Treatment

Since southern pine is not naturally resistant to decay or insect attack, it was a foregone conclusion that the pine shakes would need preservative treatment to ensure long-term durability. Preliminary results of *dip-treated* shakes were promising. But concerns were raised about the untreated wood cores being exposed where shakes were cut or trimmed on the job. With this in mind, the developers of the product decided to seek code approval only for *pressure-treated* shakes.

The three model codes—BOCA, UBC, and SBCCI—unanimously approved the use of pine shakes pressure-impregnated with preservatives according to the Amercian Wood Preservers Bureau (AWPB) Standards LP 2 and LP 3.

Before treating, the shakes must be dried to 19 percent moisture content or less. Since air drying in East Texas can take up to 65 days in summer or 160 days in winter, the shakes are kiln dried. Unlike western red-cedar, the pine shakes are easily treated using the full-cell process. Since the CCA will fix quite rapidly once the treated shakes are installed, kiln drying after treatment is neither required nor recommended.

Most plants treat to .40 pcf chromated-copper arsenate (CCA) and some now provide a 30-50-year warranty similar to that given for structural lumber by companies such as Koppers and Osmose. The labelling of the treated shake is monitored by one of the recognized agencies, Timber Products Inspection (TPI).

With the preservative treatment, the pine shakes will weather uniformly much the same as pressure-treated wood-decking—to a pleasing "buckskin-tan" color.

Installation

Pressure-treated taper-sawn pine

shakes are installed in essentially the same way as cedar shakes over spaced or solid decking. Minimum allowable roof pitch is 4-in-12.

Maximum weather exposure for 24- and 18-inch shakes are 10 and 7½ inches, respectively. In general, courses should be interlaid with 18-inch wide strips of 30-pound felt (see "Wood Shakes and Shingles," 5/87, for details).

The shakes should be installed about ¼- to ⅜-inch apart and adjacent courses offset by at least 1½ inches.

Nail with two (only) corrosion-resistant nails—hot-dipped galvanized, aluminum, or stainless-steel type 304-3/16, driven ¾ inch from each edge and 1 inch above the exposure line. Drive the nails flush, but don't crush the wood. Use No. 6 common galvanized nails, No. 6 Box, or 2-inch staples. Although staples are not recommended for cedar shakes or shingles because of their tendency to shoot through and leave a loose shingle, you can use them with the sawn pine shakes. Use a heavy, 16-gauge galvanized staple with 7/16 to ½-inch crown, and make sure the air pressure is adjusted to prevent "overdrive" of the staples.

Cost

Currently, pine shakes are sold in the neighborhood of $80 to $95 per square compared with cedar at $85 to $125. Ultimately, the superior performance of pine and its warranties will probably support prices higher than that of cedar. Currently four pine-shake mills are in production, with more mills expected to open over the next five years.

For more information, contact Brian Buchanan at the Texas Forest Service, P.O. Box 310, Lufkin, TX 75902; 409/639-8180. This article was adapted from a paper given in 10/87 at a symposium sponsored by the Forest Products Reseach Society.

—BB

repair satisfactorily. In some geographic areas such as the Gulf States, repairs on shingle roofs over ten years old and shake roofs over 15 years old should not be attempted. Foot traffic on these roofs will cause considerable breakage or dislodge the shingles.

The final decision to repair, clean, and preservative-treat a wood roof is going to be a subjective one. There are no iron-clad rules. But don't go ahead with restoration if the benefits are questionable.

Cleaning with Bleach

Depending on the condition of the wood roof, there are two methods of cleaning prior to treatment: chemical cleaners (bleaching) and power washing. In many areas of the country, wood roofs are discolored primarily by sunlight and surface mildews or algae. These roofs can be cleaned quite easily and effectively with bleaching agents such as sodium hypochlorite (household bleach) or calcium hypochlorite (swimming-pool chlorine) mixed in tapwater. These chlorine solutions quickly remove the oxidized wood fibers on the shingle surface as well as kill surface mildews and algae. The roof is transformed from its initial dirty gray color to a "buff" or buckskin tan color.

To use liquid chlorine (Purex, Chlorox, etc.): Mix one gallon of liquid bleach (5 percent sodium hypochlorite) with one gallon of water to remove mold, mildew, and the gray color. Higher concentrations of bleach (12 to 15 percent sodium hypochlorite) are available through commercial cleaning-supply companies. They can be diluted with water or used up to "full strength" if necessary to remove discoloration.

Stronger, more cost-effective chlorine solutions can be formulated using granular chlorine (calcium hypochlorite) mixed at a rate of 2 to 4 ounces per gallon of water. The type found at swimming pool supply companies (65-percent available chlorine) does a very good job of removing mildew and discoloration due to weathering. Bleach solutions are not effective, however, in removing dirt, rust stains, extractive stains, heavy moss, or lichen growth.

Whichever type of chlorine you use, you can apply the solution of chlorine and water to the roof using a typical garden-pump sprayer. Scrubbing or brushing is not necessary. Let the chemical do the work. The recommended coverage rate is 1 to 1½ gallons per hundred square feet of roof area. Let the solution stay on the roof 15 to 30 minutes, then rinse thoroughly with a high-pressure power washer or a garden hose. The high-pressure rinsing gives more dramatic results and aids in removing the oxidized wood fibers, plant organisms, and leaf debris from the roof.

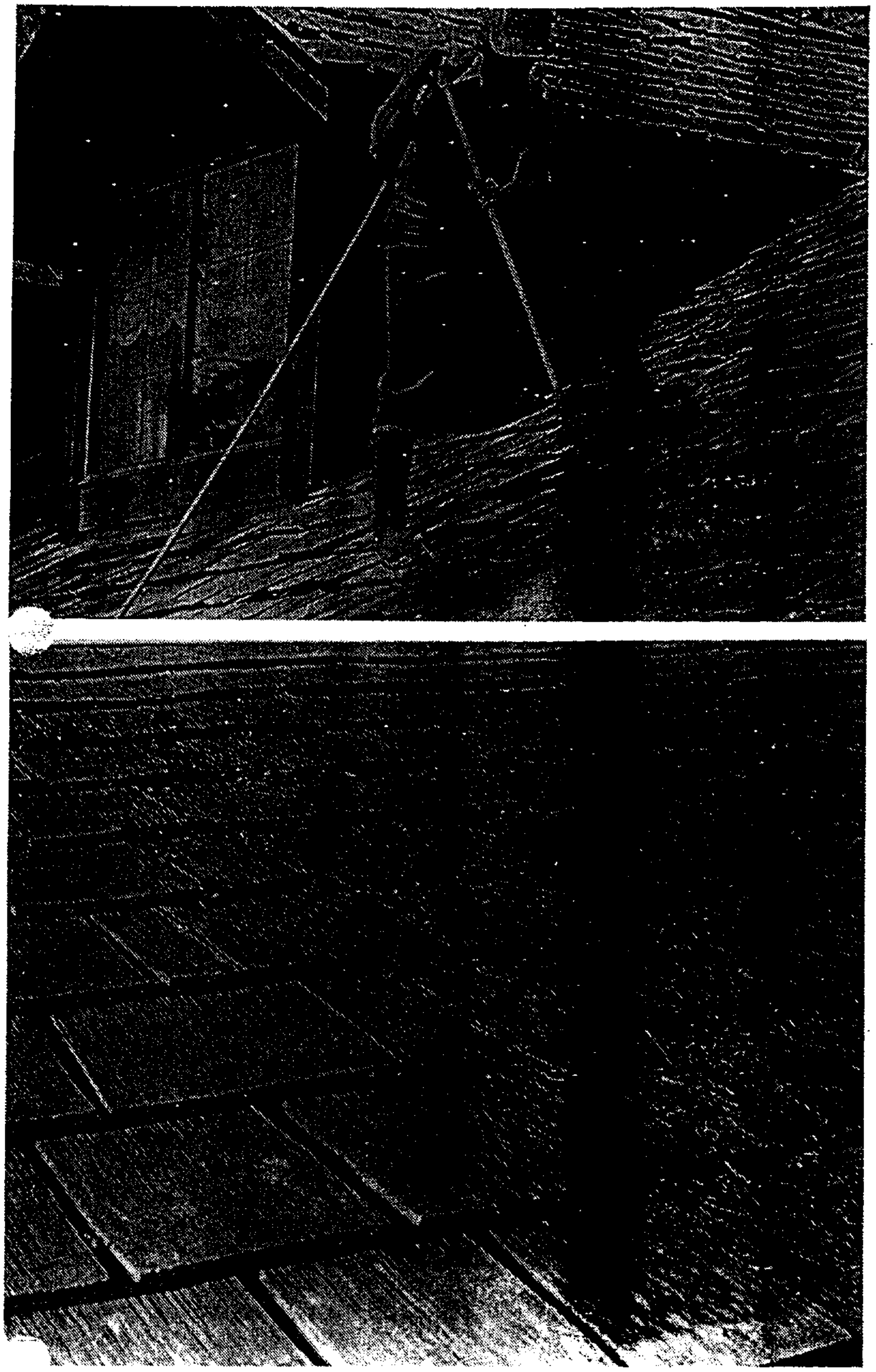
Take care not to spray vegetation. If this does happen, rinse the plants thoroughly with water. Also, chlorine solutions are corrosive and should be applied using commercial spray equipment with stainless steel or plastic internal parts. Pump-up garden sprayers work fine for small roofs but are too slow and cumbersome for large jobs or commercial applications. High-pressure spray rigs or airless sprayers are not necessary to effectively bleach the wood. Pressures of 100 to 125 psi are adequate with flow rates of ½ to 1 gallon per minute. To minimize any possible damage to shrubbery and grass, the area should be sprayed with water thoroughly before, during, and after bleaching. This eliminates the need to cover shrubbery with plastic tarps.

Power Washing

Because certain forms of algae, moss, and lichen are unaffected by chlorine solutions, they must be mechanically removed using a high-pressure washer, similar to those used to clean automobiles. Power washing of wood roofs works quite well and is used extensively on the West Coast. Power washing essentially removes the top layer of wood fibers from the shingles much the same way sandblasters remove rust from metal. Take care not to damage the shingles by using too high a pressure. Pressures of 1,000 to 1,500 psi are generally adequate to clean the roof quickly and efficiently. Although power washing is slow and dirty work, the results are truly remarkable with the roof returning to its original cedar-brown color.

Power washers can be rented through local equipment rental companies or paint stores such as Sherwin Williams for $50 to $75 per day. Those wishing to purchase power washers should specify that the units: be gasoline or diesel powered, provide 1,500 to 3,000 pounds pressure, and have a flow rate of 4 to 6 gallons per minute.

Power washing roofs is fairly straightforward. Always work from the top of the roof down, keeping your feet on the dry portion of the roof. Keep the spray wand moving a distance of 8-12 inches from the shingle surface. Use cold fresh water. Hot water washing or the use of strong soaps or cleaners is unnecessary. Experiment with various tip sizes to get the best results. A 15-degree spray fan is recommended.



Power washing with water (top), popular in California, restores cedar roofs to their original brown color (bottom), even if they are covered with bleach-resistant lichen and algae. Power washers can be rented at many paint stores. Roofs that are merely discolored can be bleached instead, which is easier on the wood.

Preservative Treatments

Until recently, it made little sense to preservative-treat an existing wood roof because of the low cost to replace. But as replacement costs rapidly approach $3 to $4 per square foot, the economics of preservative treatment look much better. One roofer's advertisement reads, "Why worry about a dirty roof? Because a clean and preserved roof looks a lot better than a re-roofer's bill!"

The high replacement costs of wood roofs and the development of new preservative finishes that are cheaper, less toxic, and more durable has made treating wood roofs feasible and desirable.

Since 1975, the Texas Forest Service (Forest Products Laboratory) has been evaluating preservative treatments for wood shakes and shingles. Results from both accelerated and long-term outdoor exposure tests indicate that a number of both water-borne and oil-borne treatments are quite effective in controlling the effects of weathering and decay for up to 5 years. The most effective products are those that contain one or more of the following:

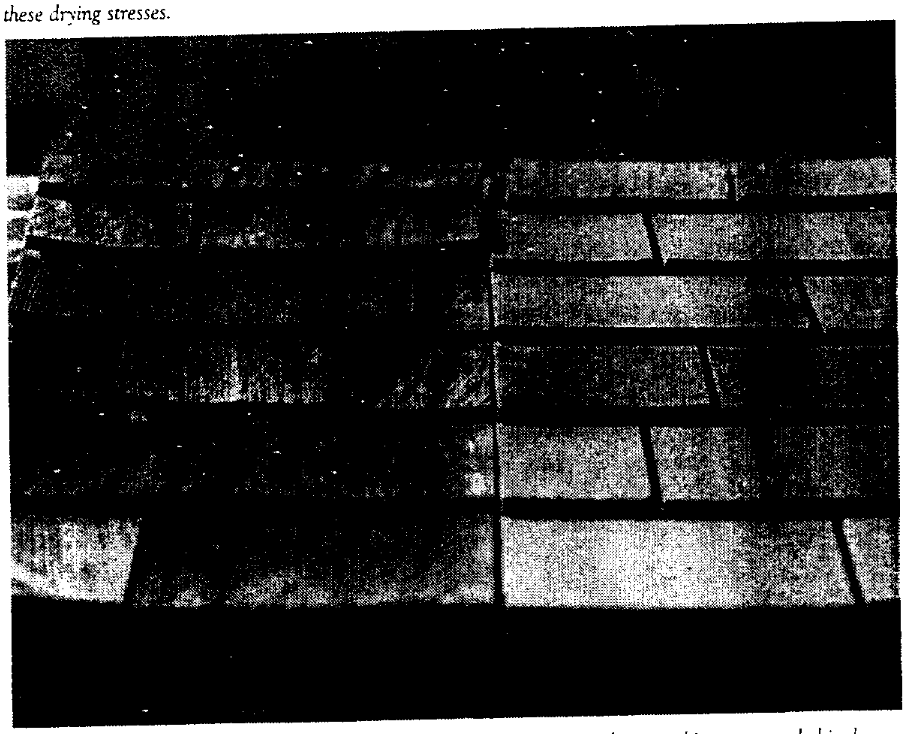
- Copper octoate (1 percent metal content)
- Copper naphthenate (1 percent metal content)
- Zinc naphthenate (3 to 4 percent zinc metal content)
- Busan 1009 or Busan 1025 (2 to 5 percent TCMTB)
- Polyphase (.5 to 1 percent 3-iodo-2-propynyl butyl carbamate)

The following is a more detailed examination of these preservatives, their cost, availability, and use. They are ranked in order of overall performance. This ranking is based upon actual long-term outdoor exposure tests on wood roofing in East Texas.

Water-Borne Preservatives

Cunapsol 5. For maximum mildew and decay resistance in a water-borne treatment, Cunapsol 5 is recommended. Cunapsol 5 (cut 1:4 with water) is quite popular with roof applicators in northern California and the Pacific Northwest because of its low cost and effectiveness in controlling moss and lichen growth. Because Cunapsol contains copper napthenate, it imparts an initial green color to the wood. If allowed to weather naturally, the color changes to a pleasing cedar brown. To hide the initial bright green color, you can pigment the Cunapsol

These 12 year-old shingles from an arid climate suffer more from sunlight than wood decay: the UV breaks down the wood, leading to cupping, curling, and splitting. Oil-borne treatments are needed to fight these drying stresses.



In a side-by-side test, cedar shingles preservative treated when new (right), outshine untreated shingles (left) after four years of exposure in the humid Gulf Coast region.

solution with Presco Cedar Brown Pigment or Millbrite 582 Pigment. Cunapsol 5 and the pigments are available from Chapman Chemical Company in Memphis, Tenn. (800/238-2523). Cunapsol 5 provides excellent mold, mildew, and decay resistance for up to 5 years or longer. But like other waterborne preservatives, it has *little effect* on cupping, curling, or splitting of the wood.

Busan 1009 (TCMTB). Busan 1009 is a liquid microbicide, which when mixed with water at a 2- to 5-percent concentration, provides effective mold and mildew control for up to three years. Outdoor exposure tests now in progress show Busan 1009 superior to zinc naphthenate in controlling surface discoloration due to molds and mildew. How well the Busan 1009 formulations will do over a five-year period remains to be seen. Current results lead me to recommend Busan 1009 at a 5- to 9-percent concentration as a suitable alternative to zinc.

Oil-Borne Preservatives

One of the main drawbacks of waterborne treatments is they do very little to control the drying effects of the sun and subsequent cupping, curling, splitting, and surface checking. A durable oilborne preservative containing a suitable naphthenic or paraffinic oil will replenish the wood with oils that have been lost by sun and rainfall. Both naphthenic and paraffinic oils (when applicable) are resistant to oxidation by sunlight, do not contribute to the flammability of the treated wood, and are reasonable in price. Care should be taken to choose only those oils *not* restricted by the Federal Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard (29 CFR Part 1910.1200) which became effective November 25, 1985. In essence, it states that certain oils manufactured today have been tested and concluded to be carcinogenic. As of November 25, 1985, these oils and any products that contain them, require special labeling. Please check with the oil supplier for clarification on this. Examples of good naphthenic oils are Chevron Shingle and Floor Oil or Sun Oil Co. Sunthen
410.

Copper octoate. New on the market copper octoate shows great promise no only in controlling mildew and decay but also in giving "life" back to age wood when combined with a suitabl naphthenic oil. A 10-percent concen trate of copper octoate must be diluted 1:9 with naphthenic oil. Like Cunapsol, the preservative is green in color and therefore must be pigmented to provide natural-looking finishes for wood roofs. It is available in 55-gallon drums only.

Oil-soluble copper naphthenates. An alternative to copper octoate is copper naphthenate. Oil-soluble copper naphthenates are available from many suppliers including Mooney Chemicals in Cleveland, Ohio (8 percent MGARD S-520), and Continental Products in Euclid, Ohio (8 percent CNS Wood Preservative-Green). Pound for pound, copper naphthenate and copper octoate are equal in performance. However, the copper octoate is available in higher concentrations than copper naphthenate making it more cost-effective to large-volume users. In addition, there is less odor with the copper octoate.

Zinc naphthenates. Although zinc naphthenates in oil are readily available and in use in many areas of the country, I cannot recommend zinc naphthenate in oil at concentrations lower than 3 to 4 percent. In mildew-prone areas, particularly in the South, 1- to 2-percent zinc-naphthenate solutions are poor performers over time. They have some merit in areas not prone to mildew and decay. Price per gallon of 3-percent zinc-naphthenate solutions will vary from $4 to $7 a gallon. Zinc naphthenate is available from manufacturers such as Interstab Chemicals and Mooney Chemicals (MGARD S-150).

Because many of the suppliers and manufacturers of preservative treatments cannot by law or will not by choice, sell to the homeowner or applicator in small quantities, you should consider using the following treatments because of their availability, price and excellent performance. These are again ranked in order of overall performance and ease of use.

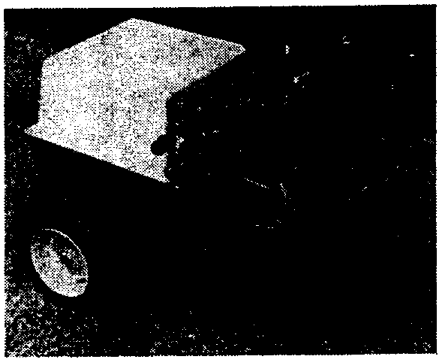
1. TWP Roof and Deck Sealant (Cedar 100 or 101 Cedartone HD), AMTECO, Inc. FSC Distributor San Diego, 619-558-080
2. Natural Seal Clear X-100, American Building Restoration Chemicals, Inc.,
3. Cunapsol 1 (pigmented water-base), Blairstown Distributors;

The Texas Forest Products Laboratory is continually searching for new and effective finishes for wood roofing. The recommendations given in this report are based solely upon tests performed here in East Texas. The opinions given here are just that—opinions—and by no means should be interpreted as an official endorsement by the Texas Forest Service.

Equipment Needed for Roof Restoration

There are as many different designs for spray equipment as there are people who sell it. Because of its low cost and availability, the common garden sprayer is an easy and effective way of applying bleach solutions, water-borne preservatives, and preservatives in light solvent. It is not suited, however, for the naphthenic-oil treatments. Also note that this is a slow and cumbersome way to apply chemicals to the roof.

Many commercial applicators choose an airless sprayer such as those manufactured by Graco, Binks, or Hero. These are excellent choices but are quite expensive and "overqualified" for roof-restoration work.



Small commercial applicators can purchase spray equipment for bleach or preservatives from lawn-care or golf-course suppliers. This unit is the Suburban Sprayer from Continental Belton Co., in Belton, Texas.

A much cheaper and more reliable sprayer can be made with a diaphragm pump. Twin diaphragm pumps such as those available from Hypro Co. (New Brighton, Minn.), are an excellent choice for wood restoration work. They are economical, dependable, long-lived, and highly adaptable. They are capable of delivering oil- or water-borne chemicals to the roof with plenty of pressure and volume. Diaphragm pumps are superior to gear and piston pumps in handling the abrasiveness of preservative solutions, particularly those containing pigments or mildewcides.

For information on quality diaphragm sprayers, contact manufacturers that supply the lawn, turf, and pest control industry such as the Broyhill Company in Dakota City, Neb., or Oldham Chemicals Co. in Memphis, Tenn. Both provide complete sprayer packages including diaphragm pumps, storage tanks, hose reels, and spray guns. Most complete spray packages sell for under $2,000.

Sprayers can be truck-mounted or totally portable depending on personal preference. Truck-mounted units eliminate the need to continually move the sprayer around the job site. Everything is self-contained on the truck bed. Usually 300 feet of hose is adequate to reach most roofs. Manual or electric hose reels are advisable when using over 100 feet of hose. Pumps are usually driven by gasoline or diesel engines.

Spray guns can be purchased from companies such as Spraying Systems Co. in Wheaton, Ill. They should be the high-pressure type (800 to 3,000 psi capacity) with spray tips of .015 to .040 orifice and a 15- to 65-degree fan. Attaching a 18-inch extension wand to the gun makes the coating process less tiring. Longer wands up to 64 inches can provide greater reach but can be heavy. They are very useful where foot traffic on the roof is limited or dangerous.

Not Eternal

Wood shingle and shake roofs are not eternal, but they can provide long-lasting performance if cleaned and treated periodically. There are many products and techniques to choose from which offer varying degrees of protection. The worst thing to do, however is to do nothing at all. ■

Brian Buchanan is a wood technologist at the Forest Products Laboratory in Lufkin, Texas.

TEXAS FOREST SERVICE

The Texas A&M University System

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Lufkin, Texas 75901

9.93

January 16, 1990

Mr. Larry Cerenzie
Fiber Saver Coatings Distributors
4060 Morena Blvd., Suite P
San Diego, CA 92117

Dear Larry,

This letter is in response to your request for information concerning the preservative treatment of wood roofs to extend their service life. Please find enclosed our "Guide to Wood Roof Restoration" which provides up-to-date information on the repair, cleaning and preservative treatment of cedar shingles and shakes.

There have been and will continue to be debates concerning the best treatment for wood roofing in California, whether one should use water or oil borne preservatives, whether the treatments in fact are effective in extending the service life. As you know, since 1975, this laboratory has been involved in research to develop coatings and finishes for wood roofing to extend their service-life. Both commercial and experimental coatings are evaluated here to rate their performance in controlling mildew, decay and the drying effects of the sun over time. Treated panels are placed outside for long-term outdoor exposure here in Lufkin. Results from these tests allow us to make qualified, unbiased recommendations to applicators such as yourself as well as homeowners, as to the type treatment best suited for a particular locale. Because the Texas climate is most conducive to mildew and decay as well as extreme summer temperatures, we feel that products that perform well here will work equally as well or better in other areas of the country, particularly California.

Oil-Borne Vs. Water-Borne Treatments

One of the main drawbacks of water-borne treatments is they do very little to control the drying effects of the sun and subsequent cupping, curling, splitting and surface checking. A durable oil-borne preservative containing a suitable napthenic or parafinnic oil will "replenish" the wood with oils that have been lost by sun and rainfall. These oils are resistant to oxidation by sunlight and do not contribute to the flammability of the roof. In California, where the average rainfall is between 10 and 20 inches, wood roofs fail more so because of the effects of the sun and high roof temperatures than of decay. We therefore recommend wood roofs be treated with oil-borne rather than water-borne preservatives. Although oil-borne preservatives are somewhat more expensive than their water-borne counterparts, their superior performance more than compensates for the additional cost.

Oil-Borne Preservatives

There are a number of oil-borne preservatives available for the treatment of wood roofs. The most effective are those that contain .5-1.0% elemental copper. Because many copper containing preservatives must be pigmented to hide their inherent green color, there can be problems with the roofs showing uneven color loss and streaking. This is usually attributed to the fact that many preservatives do not contain resins to hold the pigment in the wood. This color loss and streaking can even be more pronounced when using water-borne copper solutions.

RADCON (Note: This is the same as TWP Roof and Deck Sealant)

There is now available in California a new product called "RADCON" which is gaining popularity because of its superior performance over conventional oil-borne copper solutions. Results from exposure tests here in Texas indicate both excellent color maintenance and mildew resistance. Treated shake and shingle panels take on a very pleasing "golden color" after a few weeks of exposure. The treatment dries much faster than conventional oil treatments which eliminates the problem of dirt accumulation and odor. RADCON should be applied every 5-7 years to insure good protection to the roof. Periodic applications of preservatives such as RADCON can double or even triple the remaining service life of the roof.

One thing is certain; the worst thing to do is do nothing. The roof will surely fail due to neglect. Consumers need to apply the same care to their roofs as they do to their siding, fencing, lawns and automobiles.

Are preservative treatments for wood roofs worth the cost and effort? Yes, with current replacement costs for wood roofing averaging $2.50 - $3.50 a square foot, one should strive to protect his investment.

I hope this information will be of help to you and your customers. If I can be of further service, please contact me.

Sincerely,

Brian Buchanan

Brian Buchanan
Wood Technologist

BB/ss

Enc.

TWP PRODUCT COMPARISON CHART FOR "NEW" WOOD

twpcomp1.wk4 - march 99

PRODUCT	% SOLIDS BY WEIGHT	VOC COMPL.	NEW WOOD	WALK DECKS	SUN DECKS	ROOFS	FURNITURE	ROUGH SIDING	SMOOTH SIDING	LOG CABINS	TEAK	DOORS	GOOD POINTS	DRAWBACKS
TWP TWP-100 SERIES EPA REGISTERED VERY GOOD SYSTEM FOR NEW WOOD BROAD SPECTRUM WOOD PRESERVATIVE FOR ALL FORMS OF WOOD ROT	18.5-40%	NO	VERY GOOD W/PREP	YES #2	YES #2	NO	YES #2	YES #1	YES #2	YES #2	YES #2	YES #2	12 YEAR HISTORY Good for new & aged wood; Good color selection; Fast & positive dry	Only Fair on New Mill-planed deck surfaces
TWP SHAKE & SHINGLE **TWP-200 SERIES** MAINLY FOR SHAKE & SHINGLE ROOFING	94-0.97	YES	YES LIMITED	YES #4	NO	YES #1 BEST	NO	YES #3	NO	YES #2	NO	NO	MAXIMUM PROTECTION-8 Year History Long Lasting; Transparent after cure; Minimizes wood cracking & splitting. Controls organic growth; #1 rated Roofing System.	SLOW DRY-Very dark after application-takes 100 to 120 days to lighten; don't use on decks; Pollution fallout requires cleaning
TWP DECK&FURNITURE **TWP-300 Series** POSITIVE DRY; NO "FREE" OIL; BEST NEW WOOD SYSTEM NON-SLIP HAS SHEEN	62-65%	YES	BEST #1 W/PREP	YES #1 FAST DRY BEST	YES #1 BEST	YES #2	YES #1 BEST	YES #1	YES #1 BEST	YES #1	YES #1 BEST	YES #1 BEST	VERY HIGH SOLIDS; TWP Colors; Positive & Quick Dry; Great on New mill-planed wood; Superior UV resistance. Good for Teak; Gives "Varnish Look" with 2 coats. Good choice for lower temps (50-65 degrees F)	Must wipe surface during application to minimize GLOSS; Will rebulk moderately aged wood, and does not penetrate as deeply as TWP 500 Series & TWP 200 Shake & shingle

***** PRIME ALL NEW WOOD APPLICATIONS WITH: TWP NEW WOOD CONDITIONER**

PRODUCT	% SOLIDS BY WEIGHT	VOC COMPL.	NEW WOOD	WALK DECKS	SUN DECKS	ROOFS	FURNITURE	ROUGH SIDING	SMOOTH SIDING	LOG CABINS	TEAK	DOORS	GOOD POINTS	DRAWBACKS
TWP II TWP-500 Series LATEST TECHNOLOGY; BEST FOR "AGED" WOOD GREAT ALL-AROUND SYSTEM; FOR ALL APPLICATIONS; USER FRIENDLY	62-65%	YES	YES #3 LIMITED	YES #3	YES #3	YES #3	NO	YES #1 BEST	YES #3	YES #1	YES #3	YES #3	Good Color Selection; Latest UV & Water repellency technology; Reloads older wood with oil. Combines TWP colors with Shake & Shingle rebulking properties. Very versatile and easy to maintain.	Clean frequently; Slower Dry (4-14 days avg) Longer dry when cool/damp Recoat necessary in 6-12 m on new smooth wood (mill-planed).
TWP WATER-BORNE ACRYLIC TWP W-100 SERIES TWP COLORS PLUS GRAYS FULL BODY TO SEMI-TRANSPARENT BEST CHOICE FOR GRAY COLORS; MUST BE PRIMED WITH RECOMMENDED PRIMER	39-41%	YES	YES #1 W/PREP	YES #4	YES #4	YES #4	YES #3	YES #1	YES #4	YES #1	NO	YES #3	Longest Life Acrylic Stain available; water repellent; Latest UV protection; Superior color retention; Good over Old Linseed Oil & on decks or walkways.	Is a Film-former; Does not penetrate wood like Oil-based TWP product Will eventually show some peel.

******* RANKINGS: #1 Highest Ranking to #5 Lowest Ranking**

TWP PRODUCT COMPARISON CHART FOR "AGED" WOOD

twpcomp2.wk4 - march 99

PRODUCT	% SOLIDS BY WEIGHT	VOC COMPL.	AGED WOOD	WALK DECKS	SUN DECKS	ROOFS	FURNITURE	ROUGH SIDING	SMOOTH SIDING	LOG CABINS	TEAK	DOORS	GOOD POINTS	DRAWBACKS
TWP TWP-100 SERIES EPA REGISTERED VERY GOOD SYSTEM FOR NEW WOOD BROAD SPECTRUM WOOD PRESERVATIVE FOR ALL FORMS OF WOOD ROT	20.5-40%	NO	VERY GOOD #2	YES #3	YES #2	NO	YES #2	YES #2	YES #2	YES #2	YES #2	YES #2	12 YEAR HISTORY Good for new & aged wood; Good color selection; Fast & positive dry	Only "Fair" on New Mill-planed deck surfaces Solids too low for extremely dried-out old wood.
TWP SHAKE & SHINGLE **TWP-200 SERIES** MAINLY FOR SHAKE & SHINGLE ROOFING	94-0.97%	YES	YES LIMITED	YES #3	NO	YES #1 BEST	NO	YES #3	YES #3	YES #3	NO	NO	MAXIMUM PROTECTION-8 Year History Long Lasting; Transparent after cure; Minimizes wood cracking & splitting. Controls organic growth; #1 rated Roofing System.	SLOW DRY-Very dark after application-takes 100 to 120 days to lighten; don't use on decks; Pollution fallout requires cleaning
TWP DECK&FURNITURE **TWP-300 Series** POSITIVE DRY; NO "FREE" OIL; BEST NEW WOOD SYSTEM NON-SLIP HAS SHEEN	62-65%	YES	YES #1	YES #1 FAST DRY	YES #1 BEST	YES #3	YES #1 BEST	YES #2	YES #1 BEST	YES #2	YES #1 BEST	YES #1 BEST	VERY HIGH SOLIDS; TWP Colors; Positive & Quick Dry; Great on New mill-planed wood; Superior UV resistance. Good for Teak; Gives "Varnish Look" with 2 coats. Good choice for lower temps (50-65 degrees F)	Must wipe surface during application to minimize GLOSS; Will rebulk moderately aged wood, but does not penetrate as deeply as TWP 500 Series & TWP 200 Shake & shingle
TWP II TWP-500 Series LATEST TECHNOLOGY; BEST FOR "AGED" WOOD GREAT ALL-AROUND SYSTEM; FOR ALL APPLICATIONS; USER FRIENDLY	62-65%	YES	YES #1 BEST	YES #1 SLOWER DRY	YES #3	YES #2	NO	YES #1 BEST	YES #1	YES #1 BEST	YES #3	YES #3	Good Color Selection; Latest UV & Water repellency technology; Reloads older wood with oil. Combines TWP colors with Shake & Shingle rebulking properties. Very versatile and easy to maintain.	Clean frequently; Slower Dry (4-14 days avg) Longer dry when cool/damp Recoat necessary in 6-12 m on new smooth wood (mill-planed).
TWP WATER-BORNE ACRYLIC TWP W-100 SERIES TWP COLORS PLUS GRAYS FULL BODY TO SEMI-TRANSPARENT BEST CHOICE FOR GRAY COLORS; MUST BE PRIMED WITH RECOMMENDED PRIMER	39-41%	YES	YES #1	YES #4	YES #4	YES #3	YES #3	YES #1	YES #1	YES #3	NO	YES #3	Longest Life Acrylic Stain available; water repellent; Latest UV protection; Superior color retention; Good over Old Linseed Oil & Semi-Transparent systems.	Is a Film-former; Does not penetrate wood like Oil-based TWP product Will eventually show some peel.

******* RANKINGS: #1 Highest Ranking to #5 Lowest Ranking**

Sales & Technical Information
FSC Coatings (858) 558-0800 or (800) 579-8459

TWP 200 Series -- Shake & Shingle

Product Data Sheet

TWP SHAKE & SHINGLE PRODUCT CODES:
200 Clear, 201 H.D. Cedartone, 202 H.D. Redwood, 203 H.D. Gold, 205 H.D. California Cedar, 206 H.D. Russett Brown, 207 H.D. Butternut Brown (medium brown), 210 H.D. Slate Gray (light to med grey). For Dark roof colors, call FSC concerning proper mixes.

PRODUCT DESCRIPTION:
A high solids heavy-duty penetrative coating, specifically designed to extend the service life of shakes and shingles. The primary function is to enhance structural integrity and appearance of aged roofing. The finish composition will minimize grain cracking, cupping, surface erosion, water absorption and surface attack from mildew and algae. Although the system is highly penetrative, the residual surface film is highly resistant to destructive organisms. The penetrative portion of the product absorbs into aged and porous wood, adding bulk to aged and brittle wood fiber. This restores lubricity and flexibility to brittle shingles. At 93%+ solids, these products comply with all federal and state V.O.C. (volatile organic compounds) regulations.

PRODUCT SELECTION: See Mold & Decay Climate Index Map

200 S.T. Clear: All applications where an aged silver to ash blond appearance is acceptable. TWP 200 Clear will allow greying of the wood--TWP 200 is not intended to maintain color. Greying will occur within 6-18 months. In coastal or high altitude areas with high Ultra-Violet radiation, nightly dew or excessive rainfall, use wood tone products #'s 201, 202, 203, 205, 206, 207, 210 for best results.

201 H.D. Cedartone: For moderate to severe use. The product has a high degree of transparency to minimize hiding natural appearance of wood grain. It is ideal for shingles that are in reasonably good shape and can be cleaned to a light buff or tan color with the recommended cleaning procedures. Use in areas with mold and decay indexes up to 90.

202 H.D. Redwood: Strictly for use where a redwood appearance is desirable. Recommended only for areas with an index of 90 or below. Do not use on white or light yellow woods, such as pine, spruce, or douglas fir.

203 H.D. Cedar Gold: Use for most severe conditions. It is slightly more opaque than 201 and provides additional protection from extreme ultraviolet rays. The additional color strength provides color uniformity on surfaces that remain dark after cleaning and exhibit burnout from intense radiation. It is the preferred product in southern coastal areas with a mold and decay index of 70-130 and in high UV light regions within the 0-30 index. Do not use on wood less than 10 yrs old as it will show "too yellow." Use straight if wood has considerable grey after power wash. Blend TWP 203 with 201 for most applications at 50:50 mix.

205 H.D. California Cedar: This product is designed to restore the natural cedar color for aged cedar installations. In restoration projects, it works perfectly in moderate and extreme climates (hot or cold). Great choice for surfaces that are dry and brittle and where cleaning still leaves a gray or dark surface. The net effect is to produce a more immediate color change to simulate newer wood. Good for trying to blend new and aged wood as in roofing repairs and additions.

206 H.D. Russet Brown: This product is designed to restore or maintain the natural cedar color for all cedar installations. In restoration projects, TWP 206 is perfect where the wood surface can be power washed to a relatively new appearing shingle (or shake) or where there is still life left in the roof (replacement of 15% or less of the roof is desirable).

207 H.D. Butternut Brown: Identical to 206 except that additional brown pigment has been added to produce a /arm, medium brown color. Same benefits as 205 & 206.

210 H.D. Slate Gray: Formulated to produce a pleasing light-to-medium grey semi-transparent tone similar to driftwood color. Same benefits as other pigmented colors.

PLEASE NOTE*: **Products 201-207 take approximately 6-8 weeks to achieve final color tone**. The products appear dark upon application. 201-203 may be intermixed for color modification.*

SURFACE PREPARATION & ROOF REPAIR:
Prior to cleaning, replace cracked or severely cupped shingles. If the surface is above 15% defective, it is advisable to re-roof. Pay special attention to ridge caps. For best appearance use good aged shingles from the back of the house to replace unusable shingles in the front. Insert new shingles in old shingles place in a concentrated area as close to the bottom as possible., This procedure will give the front of the home a more uniform appearance and keep the roof from having a blotchy appearance from the insertion of random new shingles. Replace shakes and shingles before cleaning.

When fastening new shingles, be sure to use non-ferrous nails or staples. Dip galvanized fasteners are preferred. Sound shakes with minor cracking which have not begun to cup may be underpinned with galvanized sheet metal or polypropylene slip-sheets cut to the overlaying shingle size. They are easily installed using an exterior grade construction adhesive. Use 15- 25 mil polypropylene sheet stock or standard thin gauge galvanize. Plastic is the easiest to install. Other plastics, such as flexible vinyl or Mylar may also be used. Run an adhesive bead on horizontal back edge and sides. Do not apply to bottom edge. Lift the cracked overlaying shingle slightly and slide the slip-sheet under the shingle with the adhesive faced down. Press the top shingle down to secure the slip-sheet to the shingle scraper to insure adhesive contact with the surface. Allow at least 24 hours before the roof is power washed.

ROOF CLEANING:
The surface must be cleaned to remove dirt, algae, moss, mildew and loose wood fiber. Depending on climate and age of the roof, one or all of the conditions may exist. The most common method is power washing without chemical assistance. This is acceptable in most instances where the roofing is in fair condition without excessive embrittlement. In situations where the surface contains excessive amounts of algae, black mildew and loose wood fiber, it is advisable to soak the surface with a bleach solution prior to cleaning. This will allow the use of lower pressure power washing, thereby reducing the risk of creating more damage from high pressure water blasting. Chlorine bleach will only help with organic growth removal and will HURT color retention. If new wood look is desired, use Z-90 Wood Magic or X-180 Wood Restorer after chlorine bleach application (after 1 day dry period) and power wash again.

IF ANY COATINGS ARE PRESENT, THEY MUST BE REMOVED (CHEMICAL STRIPPING MAY BE REQUIRED).

BLEACH SOLUTIONS:
For organic growth removal: Standard household bleach (Sodium Hypochlorite 5-6%) or commercial strength 12-13% can be used. Normal conditions require the bleach to be applied at 2-3% active. Cut household bleach 1:1 and commercial strength 1:5 with water. Application equipment varies greatly. The delivery pumping system should be low pressure in order to prevent misting. Components must be chemical resistant plastic or stainless steel. The objective is to deliver the solution to the surface with minimum overspray or pressure. Always start applying chemical at the bottom of the roofline. This prevents rundown of dirt and chemical into dry porous

surface. Pump-up garden sprayers such as Hudson2 (stainless steel) or Maya 2(plastic) are adequate where production time is not essential. Power washers with after pump chemical siphon feed work well for fast production. Make sure that the gun, pole and tip assembly is steel or stainless steel. Keep the equipment a minimum of 50 feet from the point of application and keep covered with plastic. The working life of the solution is 5-10 minutes. Follow up with power wash rinse to remove loose residue.

FOR "LIKE NEW WOOD APPEARANCE:" Use Z-90 Wood Magic or X-180 Wood Restorer diluted 4 parts water to 1 part Z-90 or X-180. Spray apply at 100-125 ft/gal with pump sprayer. After 10-15 minutes set time, power wash surface. Note: these products are not very effective for heavy organic growth removal; therefore use chlorine bleach application and power wash to remove organic growth with 1 day surface dry before using Z-90 or X180 when organic growth is present.

CAUTION: Do not allow bleach to come in contact with aluminum windows, doors or mechanical equipment. Keep plant foliage in the immediate application area wet. Take all measures possible to prevent misting. Wear rubber gloves, splash goggles, and any equipment deemed necessary for personal protection. Water rinse all application equipment *thoroughly after* use. Cover plants and foliage with plastic. In hot weather, remove plant cover as quickly as possible.

POWER WASHING: Standard power washers generating 1500-2500 p.s.i. are adequate. The size is somewhat dependent on the experience of the user. More powerful equipment may be used for faster cleaning, provided the user has the experience not to damage the surface. Proper technique requires roughly a 45% blast angle from the plane of the surface, disregarding the roof pitch. Operate at maximum pressure and adjust the tip distance to the surface short of fraying or splintering the wood. Always work with the grain. Pay special attention to the channel keyways and remove debris accumulation. Always work down slope. Apply vertical blast to remove debris from butt ends carefully. Trim old jumbo shakes with badly frayed ends with a *high-speed* rotary trim saw.

APPLICATION: After product selection and a minimum 24 hours of drying after cleaning, product may be applied. There are many pumping mechanisms to apply product. Avoid excessive overspray by adjusting pressure to minimize misting. Most commonly used is airless spray equipment in the 1/2 to 1-1/2 gals/min pump capacity. The gun assembly should include a 3-foot extension pole with a .032 to .040 swivel wide-angle spray tip. This will allow the applicator to keep the spray close to the surface and away from him. It is preferred to spray a 3' section laterally across the roof and ending the bottom of the pattern as close to the shingle butt line as possible. This is done to avoid lapping. This is not a two-coat system. See spread rate table for approximate coverage. Use mineral spirits for equipment cleanup and save for re-use. This product may not be disposed as conventional waste. Rinse containers before disposal.
DO NOT CONTAMINATE GROUND WATER OR OPEN WATER TO PREVENT DAMAGE TO AQUATIC LIFE. USE PERSONAL AND PROPERTY PROTECTION AS PROCEDURES PRESCRIBED IN THE MATERIAL SAFETY DATA SHEET. CLEAN UP OVERSPRAY WITH SOAP AND WATER. THE USER ACCEPTS RESPONSIBILITY FOR DISPOSAL OF WASTE AND EMPTY CONTAINERS IN ACCORDANCE WITH EXISTING GOVERNMENTAL STATUTES.

SPREAD RATE: Rates will vary depending on wood porosity.

	ROOF AGE			
	1 YEAR	3 YEARS	5 YEARS	5+ YEARS
Square Feet / Gallon	250	175-200	125-150	100-125

PHYSICAL DATA: (Typical for all colors)
Non-Volatile Solids: 94-96%
Volatile Organic Solvent: 4-6%
Non-Volatile Vehicle: 90-91%
Pigment: 2-4%
Weight Per Gallon: 7.4-7.6
Specific Gravity: .88-.92
Coating V.O.C.: 40-50 gr./l

THINNING: No thinning necessary above 70° F. Below 70° F add up to a maximum of 1-quart/5 gals. of mineral spirits. Do not apply below 50°F or to damp surfaces.

DRYTIME: These are semi-drying finishes designed for penetration. Surfaces are generally dry overnight. These products, *though* mostly used on shakes and shingles, are often used for other wood applications, such as fencing and log homes. **TWP Shake & Shingle is not recommended for Deck applications**. This product must be applied to porous unsealed surfaces.

PERSONAL SAFETY: Read Material Safety Data Sheet for additional information. To the best of our knowledge, the information contained herein is accurate. However, Amteco, Inc. does not assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability, of any material is the sole responsibility of the user.

Manufactured By: Amteco, Inc.
Sales & Technical Information: FSC Coatings (858) 558-0800 or (800) 579-8459

FSC COATINGS:
Phone 858-558-0800
Fax: 858-558-2159

TWP 300 SERIES DECK & FURNITURE STAIN

TWP 300 SERIES PRODUCT CODES:

300 CLEAR
300 CLEAR "UV"
301 CEDARTONE
302 REDWOOD
303 DARK OAK
304 BLACK WALNUT
305 CAPE COD GRAY
306 PRAIRIE GRAY
311 SPECIAL REDWOOD
315 LIGHT CEDAR
318 FOREST GREEN (Special Order Only)

*Note: 300 Clear is available as a sealer or blending base only to be followed by a tinted topcoat. 300 Clear is designed to allow the wood to "grey" and will not maintain the original wood color. 300 Clear "UV" contains a ultra-violet protection package to slow the greying process and improve color retention.

PRODUCT DESCRIPTION:

A high performance penetrating oil-based surface sealer and weather protector for outdoor furniture and new wood. This VOC compliant, fast drying product is ultra-violet resistant and water repellant. In addition the TWP-300 Series Stain is specially formulated to produce a mold, mildew and fungus resistant film. It is perfect for picnic tables, wood benches, playground equipment, wood decks or new wood siding. It contains 60-65% solids but has no free oil to minimize dirt or soil attachment to treated surfaces. Being a positive dry product, it is also resistant to color rub-off on clothes when properly applied.

PRODUCT USES:

Vertical and horizontal new wood applications where positive dry is required. Perfect for old or new outdoor furniture, spas, picnic tables, benches, playground equipment, and other applications with direct human contact. Good for old and new decks where positive dry coating is a must.

SURFACE PREPARATION:

NEW WOOD: Apply a coat of "TWP New Wood Surface Conditioner" to all mill planed wood for deck use. This is optional for non traffic bearing surfaces. Make sure to remove dirt and dyer markings. The surface conditioner will enhance performance. All applications over the conditioner will result in glossy films. Let dry 48 hours before applying TWP Stains over TWP New Wood Conditioner.

OLD WOOD: Remove mildew and loose wood fiber by application of acceptable surface cleaner followed by power wash. Sand rough (checked) areas. Replace wood if severe checking or splintering is present. Old finishes must be stripped if they interfere with new coating penetration. Surface may then be finished with TWP for stain or gloss varnish coat appearance.

METHOD OF APPLICATION:

Dip, brush, roll or spray. Do not apply below 50 deg. F. Apply TWP 300 Series in thin, even coats and do not allow the material to puddle. **For varnish look** use TWP New Wood Surface Conditioner as a primer and sealer followed by TWP Deck & Furniture Stain at full strength (300-400 sq. ft./gal.) for new and aged wood applications. Two coats of TWP 300 Series are recommended. The second coat may be applied at 48-72 hours or after the first coat is dry to touch. The gloss finish properly cured provides optimum tracking and mar resistance to foot traffic. Do not wait longer than 1 week to apply the second coat.

TWP 300 Product Data Sheet Cont.

For low sheen, natural stain finish look, the surface must be wiped with a rag or applicator's pad after 15-30 minutes dwell time to minimize surface coating build-up. If not wiped, shiny areas will develop along grain lines or dense wood portions. Wiping to decrease the sheen will shorten the life of the finish.

Material should be thinned at 1 gallon Mineral Spirits to 5 gallons TWP Deck & Furniture Stain for improved penetration or to lighten color. **NOTE: Adding Mineral Spirits to this product will raise the VOC. If VOC compliance is required, this method is not recommended.

MAINTENANCE:

TWP Deck & Furniture Stain may be recoated with itself any time the surface shows aging. Apply very thin coats in order to minimize film build and insure proper cure. For furniture, benches, picnic tables, and direct human contact applications, it is recommended that this product be used for re-applications. Horizontal surfaces and hardwoods require more frequent applications than vertical applications.

SPREAD RATE:

New, mill-planed or solid powerwashed wood; 300-400 sq. ft./gal. over TWP New Wood Surface Conditioner for gloss varnish look. A second coat is recommended and may be necessary to achieve uniform gloss appearance. For stained effect on clean old and new surfaces; 200-500 sq. ft./gal., depending on porosity. For maximum durability, use the gloss finish procedure. Rough Sawn New Wood; 200- 300 sq. ft./gal., one coat only. Rough Sawn Old Wood; 150-200 sq. ft./gal., one coat only. For maximum durability pretreat rough sawn surfaces with "TWP NEW WOOD SURFACE CONDITIONER".

DRY TIME:

48-96 Hours depending on drying conditions.

THINNING & CLEAN-UP:

Mineral Spirits.

WARNING:

This product toxic to fish. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL DATA: (Typical for all colors)

SOLIDS BY WEIGHT: 62-65%

SOLIDS BY VOLUME: 55-57%

WEIGHT PER GALLON: 7.6-8.2

PIGMENT: 2-7%

COATING V.O.C: 347 grams/liter

Sales & Information: Contact FSC Coatings at 858-558-0800 or 800-579-8459
Manufactured By: Amteco, Inc.

FSC Coatings, Inc.
Phone: 858-558-0800
Fax: 858-558-2159

Product Data Sheet
TWP®--TOTAL WOOD PROTECTANT
500 SERIES (VOC COMPLIANT)

Exterior wood treatment that protects and enhances the natural warmth, beauty and integrity of both new and old wood, while complying with current Volatile Organic Compound (VOC) regulations.

PRODUCT SELECTION:

- TWP-500 Natural Wood Preparation-Clear
- TWP-501 Natural Cedar
- TWP-502 Natural Redwood
- TWP-503 Natural Dark Oak
- TWP-504 Natural Black Walnut
- TWP-511 California Redwood
- TWP-515 Light Cedar

USES:

TWP-501 - TWP-515 provide deep penetrating films that are resistant to mildew, fungus, sunlight and moisture, while enhancing the natural color of wood. TWP-500 Clear offers the same protection, but will allow the wood color to fade and bleach out or "gray" naturally while resisting unsightly mildew growth. TWP 500 Clear is not designed to maintain the original color of the wood.

SURFACE PREPARATION: (Abbreviated Instructions-See FSC Procedure for detailed)

NEW WOOD: TWP New Wood Conditioner is recommended for all new wood applications-especially on smooth surfaces. The wood must be thoroughly soaked by rain or tap water and allowed to dry for at least 48 hours before product application. This opens surface grain for best product penetration.

UNTREATED OLD WOOD: It is likely to be gray from mildew growth. For mildew removal, apply a mixture 1:1 of liquid household bleach and water or power wash. For best results, bleach, then power wash. Surface must be thoroughly rinsed and dry before product application. All old coatings must be stripped. For color restoration, apply Z-90 Wood Magic and power wash.

SHAKES & SHINGLES: Allow new installations to age one summer for best results. For restoration of old shingles, follow old wood cleaning procedures including wood bleach with Z-90 Wood Magic and power wash. Strip old coatings and power wash.

APPLICATION:

Airless spray, conventional garden sprayer, brush and roller. **DO NOT PUDDLE** ON HORIZONTAL DECK SURFACES. Pick up or [illegible]d out excess material that has not absorbed within 30 minutes. Apply at 60° F or warmer.

RECOAT:

A second coat may be required over very porous surfaces after 2 days dry on vertical or sidewall applications. Allow 30 days dry, before recoats (2nd coat) on decks. Remove and spread out excess material on flat surfaces. Do Not Puddle material on horizontal surfaces. **DO NOT APPLY THIS PRODUCT OVER PREVIOUSLY PAINTED OR SEALED SURFACES WITHOUT REMOVAL TO INSURE PENETRATION!**

COVERAGE: Mill planed new deck wood: 300-500 sq.ft./gallon per coat (wait 30-90 days before applying 2nd coat)
Rough sawn siding: 200-300 sq. ft./ gallon per coat (2-3 coats required for aged wood)
Old cedar shakes & shingles: 100-150 sq.ft./gallon per coat (2-3 coats required for aged wood)

MAINTENANCE: Avoid continual soaking of siding areas from sprinklers. Salt and chemical deposits remain on the surface after water evaporates and can be unsightly. When the finish ages for several years and begins to lose color, reapply a thin coat of TWP.

CLEAN UP: Use Mineral Spirits. On glass remove excess with mineral spirits and clean with sudsy ammonia cleaner.

DRY TIME: 2 days to 3 weeks depending on temperature & humidity.

TECHNICAL DATA

CODE NUMBER	%SOLIDS WEIGHT	%SOLIDS VOLUME	WEIGHT/ GALLON	VOC LBS/GAL	VISCOSITY
TWP500C	63.59	60.59	7.10	2.58	15" Z#2
TWP501C	63.15	59.70	7.17	2.65	<18" Z#2
TWP502C	63.85	60.31	7.20	2.61	<1 8" Z#2
TWP503C	62.10	58.76	7.13	2.70	<1 8" Z#2
TWP504C	64.20	60.98	7.15	2.56	<1 8" Z#2

F[illegible] Point: All products - 105 deg. F.

DOT Classification: Paint, Combustible Liquid, UN 1263.

To the best of our knowledge, the above technical data is true and accurate at the date of issuance, but is subject to change without notice. Liability, if any, is limited to the replacement of an equivalent amount of new product or refund of purchase price. This warranty specifically excludes labor or cost of labor.

Manufactured By: **Amteco, Inc.**

FSC COATINGS – Coatings Engineered For Ultimate Performance
Phone: (858) 558-0800 or (800) 579-8459 Fax: (858) 558-2159

PRODUCT DATA SHEET

2-605 GRAFFITTI MAX™

Exterior/Interior / Non-Yellowing / 100% Urethane / Clear Coat

PRODUCT DESCRIPTION

An extremely high performance, full gloss, graffiti resistant, clear coat for pre-existing high performance painted or structural substrates. The precatalized single package clear urethane has superior exterior gloss retention. Permanent ink marker, ball point pen, and all aerosol paint surface contamination may be removed--100% in most instances. For proper graffiti removal use **BST-100 BioStrip™**.

SURFACES

Restrooms, concrete/masonry products and wall construction. May be applied over most painted surfaces providing the finish does not lift or wrinkle existing finish. Apply small sample before proceeding. **Graffiti Max™** film should be clear, full gloss and free of surface defects other than what the profile supplies.

APPLICATION

Brush, roll or spray. **IMPORTANT NOTE:** It is absolutely essential to follow all safety precautions outlined in the Material Safety Data Sheet. Under no circumstances should this material be sprayed without all of the required protective equipment including goggles & respirator.

SPREAD RATE

Apply at 400-500 ft^2 per gallon over previously painted or non-porous surfaces. Over porous surfaces apply two coats. For maximum Graffiti resistance the finish should have full gloss appearance.

THINNING AND CLEANUP

Use Xylol or Methyl Ethyl Ketone for equipment. Throw away brushes and roller covers. Avoid skin contract with **Graffiti Max™**. Moisture accelerates cure, which makes removal from skin very difficult.

DRY TIME

Part of cure mechanism is activated by atmospheric moisture. Typical application exhibits hard dry in 3-4 hours at 75° F. & 50% R.H.

PHYSICAL PROPERTIES

VOLUME SOLIDS:	41.5%	VISCOSITY:	30-40 SEC.#4 Ford
WEIGHT SOLIDS:	47.8%	VOC:	515 gm./liter or 4.3 lbs./gal.

GRAFFITTI REMOVAL PROCEDURE

All testing has been conducted with **BST-100 BioStrip™**. **Ball point inks**--dab white cloth in **BST-100 BioStrip™** & remove ink, then wipe dry with clean cloth to remove any haze. **Permanent Marker**--Remove heavy ink as before. If slight shadowing is still visible, apply thin coat of **BST-100 BioStrip™** and let stand for 5-10 minutes. Rub area with cloth to remove remaining material and dry.

(grafmaxpds.doc—Dec1999)

Orders & Technical Info: FSC Coatings (858) 558-0800 or (800) 579-8459

Manufactured By: Amteco, Inc.

FIBER SAVER COATINGS, INC.
MANUFACTURER'S REPRESENTATIVES
Featuring:
• AMTECO TWP Natural Wood Finishes, Coatings and Paints • Futura Roofing and Coatings Systems
• Seal Krete Masonry and Concrete Sealers • Gemini Coatings and Lacquers • All Deck Systems

The A-B-C's Of Graffiti Control And Removal (Revised 1/95)

by Lawrence W. Cerenzie

One only has to drive the Los Angeles or San Diego Freeways to recognize the extent of the graffiti control problem. During the past year, we have received calls from Utah, Oregon, Washington, Alaska, New Mexico, Michigan, Mexico and many other states and foreign locations trying to figure out how to control, protect against and/or eliminate graffiti in one form or another. I even recently viewed a TV program in Los Angeles where the hosts were giving full TV exposure to name graffiti artists and their high quality work. The problem was that their "painting canvas" was yours and my fences, buildings, vehicles, doors, windows and so forth. I could not believe what I was seeing or hearing.

During this "educational program" I could not help but think of the thousands -- no millions -- of property owners pulling their hair out (provided they still have some) trying to figure out ways to keep their properties looking attractive. Good graffiti control measures have been shown to be the best deterrents to repeated "hits". Quick removal of graffiti has shown to discourage these "graffiti artists" since they want their work to be left for all to see. Unfortunately, these graffiti control measures cost us all millions in direct out-of-pocket expenses and indirectly through tax increases.

Article Intent

The intent of this article is to educate the individual property owner as to the options available to him and tradeoffs in the protective coating selection process. Our discussions will include a comparison of the various families of graffiti control coatings as well as the most effective strippers for graffiti removal from a performance and health safety approach. From these discussions, it is my hope that each property owner can develop a personalized graffiti control strategy that will best fit their pocketbook and meet their particular objectives.

Reader feedback from previous technical articles has shown that specific product recommendations are necessary for the reader to implement the ideas and concepts presented. We have followed that format in this article. The materials (and generic equivalents in some cases) mentioned here can be purchased through many local paint stores nationwide.

One must be aware that there is no single right answer to accomplish the graffiti control task given the various types of surfaces and desired looks. In fact several different approaches will probably be necessary on any large project given the variety of surfaces and finishes involved. However, some solutions will be obvious for you and feel right for your conditions.

The First Key To Successful Graffiti Control:

Identification Of Graffiti Type That Must Be Protected Against: 1) Spray Paint Only Or 2) Spray Paint And Permanent Markers

At this stage, one must determine which general type of graffiti that a particular location will be most likely to experience: 1) spray paint only or 2) permanent markers only or 3) spray paint and permanent markers. Generally, people guess spray paint tougher to remove than marking pens. However, it turns out that permanent markers are normally tougher to remove due to the unique alcohol solvent and dye system that characterizes this graffiti source. Therefore, we will consider Cases 2 and 3 together since the answer for both cases is the same. The high quality sacrificial systems and our graffiti resistant paints generally offer excellent protection from spray paint (Case 1) but only moderate resistance to markers.

Though not perfect, the aliphatic polyester urethanes, certain moisture-cured urethanes and the proprietary polyvinyl alcohol products (such as Graf Barrier) are the most marker pen resistant and spray paint resistant (Cases 2 and 3) product type (and most expensive). However, most graffiti tends to be of the spray paint variety (Case 1) which makes our protection job much easier allowing the use of less expensive product family types in many areas. Park benches, planters, trash cans, bathroom and picnic tables tend to be more prone to permanent marker type graffiti, and hence, would be a candidate for the aliphatic polyester urethanes, moisture-cured urethanes and Graf Barrier.

The Second Key To Successful Graffiti Control:

QUICK REMOVAL

The key to successful removal is timely action. The longer the graffiti sits, the tougher the spray paint or marker becomes. Time allows a more thorough cure of the applied graffiti. Hence, fast action after a graffiti hit is essential for an effective removal. As discussed previously, quick removal is also discouraging to the graffiti artist. Some data has suggested that three graffiti hits with repeated quick removal will dissuade graffiti artists and dramatically reduce the likelihood of repeated occurrences. In any case quick removal is the key.

The Third Key To Successful Graffiti Control:

Proper Graffiti Removal Techniques And Materials

We suggest that an owner or maintenance manager invest in 4 different strippers for graffiti removal. Unfortunately, each paint resin family has a little different response to a given stripper. Generally, we have found that the totally biodegradable BioStrip (AMTECO registered trademark) will do a very good job of removing most graffiti from surfaces with anti-graffiti coatings applied (it also does a good job removing graffiti from unprotected surfaces but removal is definitely more time consuming and not as complete without anti-graffiti surface protection). Bio-Strip is our first choice since disposal is not a problem unless lead based paint is removed. The other strippers are necessary to handle the wide variety of other paints or graffiti agents with which one might "hit" and that BioStrip may not remove. The 4 recommended strippers are as follows:

1) Bio-Strip as discussed.

2) High Methylene Chloride content aircraft stripper (such as American Building Restoration's 700XX) is our second choice.

3) A high caustic content stripper (such as ABR's 800 Brush Grade) is our third choice but must be neutralized with acid.

4) ABR's one of a kind Poultice Stain Remover Type 3 is a must for removing deeply embedded graffiti from block, stucco and other porous substrates.

The above materials are potent stripping materials and require appropriate personnel and landscape protection. The Bio-Strip is the "nicest" to use from a people perspective. It is worthy to mention that power washing with hot water after stripping always increases the effectiveness of paint removal.

The Popular "Let's Just Paint Over It Fix" Does Not Work --
Numerous folks have tried just painting over graffiti. We have all seen the evidence of this technique with the "patchwork quilt" look along building walls, fences and freeway structures. Besides being ugly, most people do not realize that paint will start to fail due to a shearing action from the weight of multiple layers -- normally 5-7 coats (15-20 dry mil thickness). When that critical thickness is reached, the paint will start to peel leaving various layers exposed.

This peeling is happening in Los Angeles along the freeways where yellow from one layer shows, orange from a second layer shows and blue from yet another layer is apparent. It looks horrible with the only cure being sandblasting or chemical stripping -- very expensive. The lesson to be learned from this mistake is that there is no "quick fix" in fighting the graffiti problem.

The Fourth Key To Successful Graffiti Control

Selecting Anti-Graffiti Coatings And Paints

Graffiti control for painted or unpainted masonry, stucco, wood or metal surfaces can be accomplished in several ways. Our discussions will be centered around the basic decisions that must be made as follows: 1) whether to use permanent or sacrificial coatings; 2) whether to protect against spray paint only or permanent marking plus spray paint and 3) whether to use transparent or pigmented (colored) protective, anti-graffiti coatings.

Permanent VS Sacrificial Coatings

When referring to anti-graffiti coatings, a permanent system is generally defined as a coating or paint that is not removed during the graffiti clean-up operation. When graffiti is applied, permanent systems are generally cleaned with a light stripper (possibly power washed) with normally minimal effect on the original coating. True polyurethanes, AMETCO's new Graf Barrier and the "Graffiti No More" version of AMTECO's Maxlife and TWP water-borne systems are considered permanent coatings. Epoxies are not considered good candidates since they generally break down very quickly in the presence of sunlight (UV).

Permanent coating materials can be very cost effective since no additional protective coating is required to achieve a high level of graffiti resistance. These types of systems are particularly attractive for apartments, schools, large condominium projects, utilities, public buildings of all types, large amusement parks (such as PIER 39 in San Francisco), transportation authorities (bridges, signs, overpasses, etc.) and industrial parks.

Low Sheen, "Clear" Solution For Stucco And Other Masonry

Of all the permanent materials of which I am aware, only Graf Barrier maintains a true low sheen or matte finish for masonry walls of all kinds: stucco, block, brick or concrete. In many cases, Graf Barrier cannot be detected as being present.

A Word Of Caution

The reader must remember that repainting or recoating an anti-graffiti system that is designed to be resistant to paints or coatings will require more substantial (and more costly) surface preparation work. This is particularly true of the super polyurethanes mentioned herein. If frequent color changes are a regular occurrence due to the particular type of business one is engaged in, permanent coatings (particularly polyurethanes) may not be a good option. It should be noted that Graf Barrier and Graffiti No More Paints can be easily recoated following a special preparation procedure.

Polyurethanes As Permanent Coatings

Usually polyurethanes are considered permanent coatings since when properly applied (and of the right urethane type) the premium aliphatic systems can last 10-15 years and graffiti can generally be removed without stripping the urethane. We are only recommending solvent-borne aliphatic urethanes in this discussion because of their superior chemical & moisture resistance as well as lower applied cost when compared to the currently available water-borne urethane technologies that we have evaluated to date.

1) Exterior Clear Sealers -- For clear urethane sealing applications of masonry walls, park benches, trash cans and exposed aggregate walls, one should only consider aliphatic polyester urethanes (cost $80-120 per gallon) or aliphatic moisture cured urethanes (less expensive, $60-100 per gallon) for exterior applications where maintaining clarity of film (non-yellowing) and appearance are important. These types of materials are used in heavy duty, industrial environments where solvent and chemical resistance is a must. These types of coatings are very resistant to permanent markers (Magic Marker or equivalent) and the strong solvent systems present in some solvent-based coatings. **Graffiti Max, which falls into these categories, is the most graffiti resistant and physically the strongest polyurethane that we know of -- quite a statement !!!**

Some clear urethanes cost as low as $30-45 per gallon. The low cost varieties unfortunately are one of the following: 1) aromatic urethanes which yellow when exposed to sunlight, 2) very low solids (lots of solvent or water with very little urethane) or 3) lower grade, low solid acrylic urethanes which are usually much less graffiti resistant. The recommended, high quality urethanes will cost more but last and protect much longer. In general, water-borne urethanes have less than desirable water resistance for standing water or routine wetting scenarios.

It should be noted that these materials tend to give a full "wet look" gloss which is undesirable for many masonry applications (particularly on stucco and special decorative blocks & bricks like split face or slump stone).

2) Colored Or Pigmented Polyurethanes -- Where pigmented coatings or paints are desirable and permanent markers are not considered as a big problem, lower cost alternatives are available. For areas that have special VOC solvent emissions requirements (California; some East Coast states; some areas in Texas; areas around Phoenix, Arizona; and so forth) these systems will range from $60-90 per gallon. For areas without such environmental regulation, costs may range from $45-$90 depending on the solids (per cent of active ingredients) content.

Generally, pigmented urethanes are considered for long life metal applications. We have used a very tough, high performance 2 component acrylic aliphatic urethane system on PIER 39's metal doors, railings, bollards (ship tie-downs), structural members and bracing because of its excellent weathering and color maintenance properties.

New Technology, Low Cost Replacement For Urethanes

However, recent testing over the last few years on PIER 39 has shown that our new SA-3 Silicone Alkyd system over the ZERO RUST primer has many of the favorable high strength and gloss retention properties of urethanes which make it ideal for metal applications where graffiti control and high gloss retention are a must. What makes the success of this new silicone alkyd technology so exciting is that this performance is being achieved at a much lower price and in very low odor formulations (big advantages over urethane systems in general). PIER 39's maintenance personnel have reported that after a 30 day cure period, graffiti as knife carving and scratch damage has almost been eliminated in areas where it was previously a significant problem because of the unique strength and shear properties of the SA-3 Silicone Alkyd system.

Economical New Water-borne Paint Technologies As Permanent Anti-Graffiti Coatings: "Graffiti No More"

AMTECO has developed tremendously effective, graffiti resistant version of their TWP Water-borne Stain System that has proven to be excellent performer on San Francisco's famed PIER 39. This new, optimized system is appropriately named "Graffiti No More". Dave Carter, Maintenance Superintendent for Pier 39, has reported that spray paint graffiti is easily removed using light stripper solutions without leaving shadows. These materials have made graffiti a very easy problem to deal with and saved incredible amounts of labor and materials. The key to their durability and graffiti resistance is that they are essentially highly modified, chemically enhanced, acrylic systems designed for tough desert, onshore and offshore exposures.

These "Graffiti No More" materials are routinely used on wood, masonry, stucco and galvanized metal surfaces. This technology is available as a stain (40% solids) and a paint (more pigment and hiding capacity than a full body stain) with a very high solids content ranging from 50-55% depending on color.

The special "Graffiti No More" Paint System is considered permanent with an expected life ranging from 7-10 years (without graffiti hits) depending on the service and actual exposure. The big advantage of the "Graffiti No More" coatings over urethanes is much lower cost since they typically run between $20-25/gallon. Some versions of this technology have lasted over 10 years without chalk, fade or peel in true southern exposures (toughest possible weather orientation) -- the very best paint performance I have ever seen. For planning and budgeting I would figure 7-10 years.

Some touch-up will be necessary over the life of the system, especially if repeated graffiti hits occur over the same areas of the paint or stain. The amount of touch-up is directly related to the skill of the removal personnel, cleaning tools used, the type of stripper used and stripper dwell time. Because these systems have such a long life and are tremendously fade resistant, touch-up even after a few years is usually not a problem as long as material from the original batch is used for the touch-up.

New Transparent, Low Sheen Permanent Technology -- And Its Not A Urethane !! -- As mentioned above, a new product called Graf Barrier (not to be confused with sacrificial Graffiti Barrier by Seal-Krete) has shown tremendous potential in various masonry and painted surface applications. This material is water-borne which means that it can be applied over latex paint systems without affecting their adhesion to the substrate. Graf Barrier has an expected life of 3-7 years depending on the actual service and number of graffiti hits. At $50-70/gal, Graf Barrier is more expensive than the best sacrificial coatings but significantly less than the more expensive aliphatic urethanes. It also can be easily removed with a special procedure for easy repaints as the underlying paint system breaks down from exposure to the sun and weather. This system is worthy of consideration for painted surface applications where a long life graffiti-resistant clear coat is desired.

Leaving a matte finish, Graf Barrier also makes a tremendous permanent coating for unpainted masonry -- stucco, brick or block. By using the clear sealer, Prime & Seal, as the sealer/primer followed by 1-2 coats of Graf Barrier, tremendous graffiti resistance as well weather resistance is developed. This is the best choice for permanent protection of most masonry and previously painted surfaces from weather or graffiti while still maintaining a matte or low sheen finish.

Sacrificial Systems

Sacrificial systems are generally clear, water-based wax emulsions in acrylic or other resin complexes. When hit with graffiti, the systems are generally stripped with graffiti attached to the coating by paint strippers or power washing or both. The coating is simply reapplied to the affected areas after graffiti removal. Most of these clear systems have expected lives ranging from 1-3 years. They can be used on painted and unpainted wood, metal and masonry surfaces. Depending on quality and volume, these systems generally range from $20-$40 per gallon for volume customers.

Our experience and the experience of our customers has shown many of these systems are difficult to remove or are quite permeable to the graffiti. Based on this experience, 2 sacrificial graffiti systems are recommended: ABR's PolyShield and Seal-Krete's Graffiti Barrier.

With a 5 year track record and expected life in the 3-5 year range, the PolyShield Systems has shown excellent results in a number of applications including service for the Chicago Transit Authority subway cars and facility structures (painted and unpainted surfaces of all types). It has been used by numerous public and private clients including school districts, public works projects, Macy's Department Stores, Target Stores, home fences and so forth over the last few years.

Another sacrificial system showing great promise is Graffiti Barrier. This system is very graffiti resistant (possibly the most resistant sacrificial system we have seen) and very easy to remove with water or strippers. At present, Graffiti Barrier is so easy to remove that direct weather exposure to rain or sprinklers is not recommended. It is perfect for use in areas without direct exposure to water or rain such as covered walkways.

There are some less expensive wax emulsions on the market with very low or zero resin/binder content. The problem seems to be durability and long term appearance. Some materials have been shown to attract dirt requiring regular power washing and material reapplication to maintain a proper appearance. So be careful when buying some of the low cost systems -- one day you may wake up with a little surprise that lasts a long time.

The Fifth Key To Successful Graffiti Control:

Developing Your Own Custom Program

In the next few paragraphs, I will share some thoughts based on the discussions of each of the four previous sections that will hopefully address your particular needs. The result of this section should be a general framework for your own particular graffiti control program. In each paragraph I will make an assumption and do my best to address how to handle that particular case.

Case 1: Your Project Has Recently Been Painted.
In this case either the permanent clear coat Graf Barrier (longest lasting, most durable and most cost effective over the long run) or the sacrificial systems (lowest initial cost) would generally be your best bets. If permanent markers are a problem, Graf Barrier is generally the best answer over water-based paints.

Case 2: Your Project Needs Painting
Generally, I would say use the "Graffiti No More" paint. At this point I am not aware of another paint or stain system offering these superior anti-graffiti properties. If permanent markers are a problem, "Graffiti No More" Paint followed by 1-2 topcoats of Graf Barrier (2 coats of Graf Barrier best) is worthy of consideration. (Note: Surface conditioning or priming will be necessary if the surface is currently chalky, peeling, "punky" or if significant organic growth is present.)

Case 3: You Have Unsealed Masonry Or Stucco In Your Project.

Alternative A: Permanent Urethane "Wet Look" -- The longest lasting but most expensive system will be a moisture cured 100% urethane called Graffiti Max. If permanent markers are a problem, an aliphatic/polyester two component urethane is the next best choice.

Alternative B: Permanent Coating With Little Change to Surface Sheen -- The surface should be sealed and primed with Prime & Seal followed by 1-2 coats of Graf Barrier. This system will stop liquid water migration though the protected surface minimizing certain types of efflorescence as well as yield tremendous graffiti resistance. Cleaning dirt or graffiti from a surface protected by

Graf Barrier will be very simple.

Alternative C: Sacrificial Clear Systems With Low Sheen or High Gloss -- The least expensive initial cost method would be use of a system like PolyShield For Unpainted Masonry (clear sealer) to provide sealing benefits as well excellent graffiti resistance properties. For cost efficiency, the surface should be sealed with Seal-Krete Masonry Sealer or Prime & Seal prior to coating with PolyShield. Be sure to consider gloss options in your decision. Remember, sacrificial systems must be routinely reapplied following graffiti removal which means higher long term labor costs.

Alternative D: You Want To Change The Color Or Look Of Your Masonry Or Stucco -- This scenario generally implies painting or staining the masonry surface. For very good graffiti protection and fantastic weather resistance, use 2 coats of Graffiti No More paint over a heavy Prime & Seal primer/sealer coat. This is the least costly way to accomplish these objectives. If maximum graffiti resistance is desired, apply Graf Barrier over the top of one coat "Graffiti No More" Paint (use Prime & Seal as primer).

Case 4: You Have Steel Buildings Or Wrought Iron Fences.

In this case the urethanes are your best bet. Surface preparation, primer selection plus proper thickness and mixture control are key. If you are painting over aged galvanize, the "Graffiti No More" Systems would work great. Working with metals requires someone who knows what they are doing. Special instructions are warranted here. The SA-3 Silicone Alkyd Systems would also make a good choice at a lower cost here where high gloss retention is desired.

Case 5: You Have Natural Wood Siding, Decking Or Fencing.

If your natural wood is presently protected, apply a sacrificial coating like PolyShield. If it is not coated, the first step is to seal the wood with an extremely water repellent system like TWP Deck & Furniture (300 Series) or TWP II (500 Series) -- apply two coats. Recent testing has shown both of these TWP systems to be tremendously effective to markers and spray paint. As a result of this test work, TWP has been specified on several schools being built in Santa Monica and Riverside County (Los Angeles area). If this does not work sufficiently then apply a permanent system such as a moisture cured urethane or sacrificial system such as PolyShield as your true graffiti protection.

In Conclusion

Hopefully, this article helps you to select your proper course of action. We have attempted to explain what should be used and where from surface protection, appearance and graffiti control viewpoints. If you have any questions, someone in our office will be glad to assist you (619-558-0800). I wish you many happy days free from graffiti problems.

About The Author...

With 20 years experience in the materials technology and protective coatings arena, Larry Cerenzie has been involved in projects ranging from the Trans-Alaskan Pipeline and Alaskan North Slope oil fields, to the design and construction of multi-unit apartment buildings. One of his current projects is the restoration of the famous PIER 39 in San Francisco. Larry's contributions have been recognized with selection as one of the Outstanding Young Men of America in 1985, listed in the WHO's WHO Of American Executives for 1993 and a finalist for Petroleum Engineer of the Year honors for the state of Alaska.

Larry has a B. S. in chemical engineering from LSU and a Masters Degree in Engineering Management from the University of Alaska at Anchorage. He presently serves as Engineering Manager for Fiber Saver Coatings, Inc., in San Diego. He has written several articles on protective coatings for many types of surfaces and uses including wood, masonry and metal applications.

Technical assistance and advice for this article was supplied by William Reckel, an outstanding chemist with over 30 years coating formulation, evaluation and application experience. Mr. Reckel has formulated coatings for projects of many types for uses all over the world. He is currently President of AMTECO, Inc., a high tech coatings manufacturing and consulting corporation.

grafart2.lw5 Revised 1/95

[redacted]

September 2, 1997

FSC Fiber Saver Coating, Inc.
5360 Eastgate Mail Road, Suite F
San Diego, Ca. 92121

Dear Cheryl Walczak:

Since we have installed your "Graffiti Max " on our gymnasium our graffiti problem has virtually stopped! I have used this product on other locations and have experienced the same results. I plan to continue using Graffiti Max on up coming building projects. Anyone wanting to protect there building should try this product. Taggers see the shinny coating and just pass it by knowing how easy it is to remove their tags.

Sincerely,
Richard Thompson

Richard Thompson

Building Project Supervisor

707 F STREET · CHULA VISTA, CALIFORNIA 91910 · (619) 691-5027

Product Name: Zero Rust
Product Code: Zero Rust 28-60QT-GA_FG, 28-61QT-GA-FG
28-62QT-GA_FG, 28-63QT-GA_FG, 28-67QT-GA-FG,28-68QT-GA-FG
28-70QT-GA-FG, 28-71QT-GA_FG, 28-72QT-GA_FG,28-95QT-GA-FG

HMIS CODE:	H	F	R	P
	2	3	0	G

=============== SECTION I - MANUFACTURER IDENTIFICATION ===============

MANUFACTURER NAME: AMTECO, INC
DISTRIBUTED BY: FSC COATINGS, INC.
5360 EASTGATE MALL ROAD, STE F
SAN DIEGO, CA 92121

EMERGENCY PHONE: 1-800-424-9300
INFORMATION PHONE: 1-800-579-8459
DATE REVISED: 02-05-97

=============== SECTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION ===============

		OCCUPATIONAL EXPOSURE LIMITS			VAPOR PRESSURE		WEIGHT	
HAZARDOUS COMPONENTS	CAS NUMBER	OSHA PEL	ACGIH TLV	LD50 RATS	mm Hg @	TEMP	PERCENT	LC50 (RAT)
NORMYL BUTYL ACETATE	123-86-4	150 PPM	150 PPM	14 G/KG	8.4	68F	5	633PPM/4H
* METHYL PROPYL KETONE SOLVENT	107-87-9	200PPM	200PPM	3.7 G/KG	27.8	68F	8	200 PPM 4H
* SOLVENT NAPTHA (PETROLEUM) LIGHT AROMATIC	64742-95-6	200 PPM	200PPM	4.7 G/KG	12.4	230f	18	3670PPM
MAGNESIUM SILICATE HYDRATE	14807-96-6	———	2 MG/M3	———	N/A		25	———
XYLOL / XYLENE	1330-20-7	100PPM	100PPM	4.30 G/KG	9.5	408F	2	6700PPM/4H

* INDICATES TOXIC CHEMICAL(S) SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III AND OF 40 CFR 372.
XYLENE - SKIN DESIGNATION - CANADA WHMIS
THIS PRODUCT IS PHOTOCHEMICALLY REACTIVE PURSUANT TO SCAQMD RULE 102

=============== SECTION III - -PHYSICAL/CHEMICAL CHARACTERISTICS ===============

BOILING POINT: 300 DEG F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C. : 3.34 LB/GL (400 G/L)
MATERIAL V.O.C. : 3.34 LB/GL (400 G/L)
SOLUBILITY IN WATER : NON SOLUBLE
APPEARANCE AND ODOR: LIQUID WITH KETONE ODOR

SPECIFIC GRAVITY (H20=1): 1.3
EVAPERATION RATE: SLOWER THAN ETHER

ODOUR THRESHOLD: N/D
VAPOR PRESSURE: 8.4 @ 68 F
COEFFICIENT OF H20/OIL
DISTRIBUTION; LESS THAN 1%

=============== SECTION IV - FIRE AND EXPLOSION HAZARD DATA ===============

FLASH POINT: 68 DEG F (168 Deg F/TOC) METHOD USE: TCC
AMMABLE LIMITS IN AIR BY VOLUME - LOWER: 1.1% UPPER 7.6%
TINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER MAY BE INEFFECTIVE BUT SHOULD BE USED TO COOL EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS
KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT. COMBUSTIBLE MATERIALS CONTAMINATED WITH OVERSPRAY OR LIQUID RESIDUES OF THIS PRODUCT MAY UNDERGO SPONTANEOUS COMBUSTION. MECHANICAL IMPACT SENSITIVITY-NONE. STATIC DISCHARGE SENSITIVITY-UNKNOWN.

=============== SECTION V - REACTIVITY DATA ===============

STABILITY: STABLE
CONDITIONS TO AVOID
EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)
NITRATES, STRONG OXIDIZING AGENTS, STRONG ACIDS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
NONE-HAZARDOUS COMBUSTION PRODUCTS : CARBON MONOXIDE, SMOKE, OXIDES OF NITROGEN
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
NONE

=============== SECTION VI - HEALTH HAZARD DATA ===============

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
M CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION INCLUDING REDNESS, DRYNESS AND ITCHING
INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

ZERO RUST **MATERIAL SAFETY DATA SHEET**

HEALTH HAZARDS (ACUTE AND CHRONIC)
IRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE OVEREXPOSURE MAY HAVE THE FOLLOWING FECT: CARDIAC ABNORMALITIES. THIS PRODUCT CONTAINS A CHEMICAL WHICH IS KNOWN TO BE A SKIN IRRITANT. SENSITIZATION TO SKIN. TERATOGEN-YES (XYLENE) REPRODUCTIVE TOXICITY-NONE MUTAGENCITY-NONE SYNERFISTIC PRODUCTS-NONE

CARCINOGENICITY: NTP? NO IARC **MONOGRAPHS?** NO **OSHA REGULATED?** NO

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES
INHALATION; MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES, CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. AVOID BREATHING VAPORS, VENTILATE AREA. REMOVE WITH INERT MATERIAL.

WASTE DISPOSAL METHOD
INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES, CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.
THIS MATERIAL IS DESIGNED FOR APPLICATION ONLY BY PROFESSIONAL TRAINED PERSONNEL USING PROPER EQUIPMENT UNDER CONTROLLED CONDITIONS.

SECTION VIII - CONTROL MEASURES

PIRATORY PROTECTION
USE WITH ADEQUATE VENTILATION. OVEREXPOSURE TO VAPORS MAY BE PREVENTED BY ENSURING VENTILATION CONTROLS, VAPOR EXHAUST OR FRESH AIR ENTRY. NIOSH MSHA APPROVED (TC - 23C) AIR PURIFYING OR AIR SUPPLIED (TC-19 C) RESPIRATORS MAY ALSO REDUCE EXPOSURE.
VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT KEEP VAPOR CONCENTRATION BELOW LISTED LEVELS MECHANICAL EXHAUST IS REQUIRED.

PROTECTIVE GLOVES
IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION
USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HANDS BEFORE EATING, SMOKING OR USING WASHROOM.

SECTION IX - DISCLAIMER

DISCLAIMER
TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

28-62 (@ 275 g/1)
08/31/98

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: BLACK ZERO RUST PRIMER 275 g/1 VOC
PRODUCT CODE: 28-62 (@ 275 g/1)

HMIS CODES:	H	F	R	P
	2	3	0	G

================== SECTION I - MANUFACTURER IDENTIFICATION ================

MANUFACTURER'S NAME: AMTECO, INC., PACIFIC, MO
TECHNICAL INFORMATION: FSC COATINGS, INC.
5360 EASTGATE MALL ROAD, STE. F
SAN DIEGO, CA 92121
EMERGENCY PHONE: 800-424-9300
INFORMATION PHONE: 619-558-0800
DATE PRINTED: 08/31/98
NAME OF PREPARER: N/A

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION =========

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT
* TETRACHLOROETHYLENE OSHA PEL: 100PPM, ACGIH TLV: 100PPM	127-18-4	12.07
2-PROPANONE OSHA PEL: 750 PPM TWA 1000 PPM STEL ACGIH TLV:750 PPM TWA 1000 PPM STEL	67-64-1	10
TCC OSHA PEL: N/A, ACGIH TLV: N/A, OTHER: N/A	98-56-6	5
SOLVENT NAPTHA (PETROLEUM) HEAVY AROMATIC OSHA PEL: 25 PPM TWA 15 PPM STEL ACGIH TLV:25 PPM TWA 15 PPM STEL	64742-94-5	5

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.
PAINT, 3, UN 1263, PG.II EMG GUIDE #127

=============== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS ============

BOILING RANGE: 133 F - 355-420 F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 2.25 lb/gl
SOLUBILITY IN WATER: INSOLUBLE
APPEARANCE AND ODOR: BLACK LIQUID MILD SOLVENT ODOR
SPECIFIC GRAVITY (H2O=1): 1.36
EVAPORATION RATE: SLOWER THAN ETHER
MATERIAL V.O.C.: 1.67 lb/gl

================= SECTION IV - FIRE AND EXPLOSION HAZARD DATA ==============

FLASH POINT: 35 F
METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.9
UPPER: 12.8

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
WEAR A SELF-CONTINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WITH APPROPRIATE TURN-OUT GEAR AND CHEMICAL RESISTANT PERSONAL PROTECTIVE EQUIPMENT.

UNUSUAL FIRE AND EXPLOSION HAZARDS
WATER MAY BE USED TO COOL CONTAINERS. VAPORS MAY CAUSE FLASH FIRES. KEEP

CONTAINERS TIGHTLY CLOSED AND ISOLATE FROM HEAT, SPARKS AND FLAME. NEVER USE
WELDING OR CUTTING TORCH ON OR NEAR CONTAINERS EVER IF EMPTY. RESIDUE CAN STILL
IGNITE.

SECTION V - REACTIVITY DATA

STABILITY: STABLE
CONDITIONS TO AVOID
AVOID CONTACT WITH STRONG OXIDIZERS, HIGH TEMPERATURES AND OPEN IGNITION
SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID)
OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON DIOXIDE, CARBON MONOXIDE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
INHALATION OF VAPOR OR MIST CAN CAUSE HE FOLLOWING:
IRRITATION TO THE UPPER RESPIRATORY TRACT, MAY CAUSE NAUSEA, HEADACHE, FATIGUE,
LOSS OF APPETITE. HIGH CONCENTRATIONS CAN CAUSE COLLAPSE, BRONCHITIS, PNEUMONIA
AND CONVULSIONS.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
SKIN: CAN CAUSE IRRITATION. CAN CAUSE DEFATTING OF SKIN, WHICH CAN LEAD TO
DERMITITIS.
EYE: LIQUID AND VAPOR CAN BE IRRITATING TO EYES. SYMPTOMS INCLUDE TEARING,
REDNESS AND DISCOMFORT.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
THIS PRODUCT IS NOT EASILY ABSORBED. PROLONGED CONTACT MAY RESULT IN THE
EXTRACTION OF NATURAL OILS CAUSING IRRITATION AND DRYNESS.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
TOXIC IF SWALLOWED. WILL CAUSE VOMITING, NAUSEA, DIARRHEA. HIGH
CONCENTRATRTIONS CAN CAUSE COLLAPSE, PNEUMOLNIAAND CONVULSIONS.

HEALTH HAZARDS (ACUTE AND CHRONIC)
BREATHING DIFFICULTIES, DIZZINESS, LOSS OF COORDINATION AND HEADACHE ARE SIGNS
OF EXPOSURE TO CONSENTRATIONS ABOVE THE TLV.
REPORTS HAVE ASSOCIATED REPEATED AND PROLONGED OCCUPATIONAL OVEREXPOSURE WITH
PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.
INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS MAY
BE HARMFUL OR FATAL.

CARCINOGENICITY: NTP CARCINOGEN: N/A IARC MONOGRAPHS: Yes OSHA REGULATED: N/A
N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
PRE-EXISTING DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, NERVOUS
SYSTEM, RESPIRATORY AND/OR PULMONARY SYSTEM, LUNG(E.G. ASTHMA-LIKE CONDISITONS).

EMERGENCY AND FIRST AID PROCEDURES
INHALATION: MOVE SUBJECT TO FRESH AIR. RESTORE BREATHING IF NECESSARY. TREAT
SYMPTOMATICALLY AND CONSULT PHYSICIAN. EYE & SKIN CONTACT:FLUSH EYES WITH LARGE

AMOUNT OF WATER FOR ATLEAST 15 MINUTES. SEE A PHYSICIAN IMMEDIATELY. WASH SKIN AFTER REMOVING CONTAMINATED CLOTHING WITH MILD SOAP AND WATER FOR 15 MINUTES. SEE PHYSICIAN IF IRRITATION PERSISTS. INGESTION: DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER EDIATELY. TREAT SYMPTOMATICALLY. NEVER GIVE LIQUIDS TO AN UNCONSCIOUS PERSON.

=========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ============

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
STOP SPILL AT SOURCE. ELIMINATE ALL IGNITION SOURCES(FLARES, OPEN FLAMES, PILOT LIGHTS, ELECTRICAL SPARKS). USE ONLY NON SPARKING TOOLS FOR CLEAN UP. SUPPLY ADEQUATE VENTILATION. AVOID BREATHING OF VAPORS. USE RESPIRATOR. CONTAIN AND REMOVE WITH INERT ABSORBENT.

WASTE DISPOSAL METHOD
DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP ALL CONTAINERS TIGHT AND IN AN UPRIGHT POSITION TO PREVENT LEAKS. STORE CONTAINERS OUT OF SUN AND AWAY FROM ALL HEAT SOURCES. THIS MATERIAL SHOULD BE GROUNDED WHEN POURING. DO NOT STORE NEAR HEAT, SPARKS OR OPEN FLAME.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

==================== SECTION VIII - CONTROL MEASURES =====================

RESPIRATORY PROTECTION
DO NOT BREATHE VAPORS OR SPRAY MIST. WEAR AN APPROPRIATE, PROPERLY FITTED RESPIRATOR (NIOSH/MSHA APPROVED) DURING APPLICATION AND OTHER USE OF THIS MATERIAL UNTIL VAPORS AND MISTS ARE EXHAUSTED AND EXPOSURE IS BELOW LISTED TLV(S). USE APPROVED CHEMICAL/CECHANICAL FILTERS DESIGNED TO REMOVE A MBINATION OF PARTICLES AND VAPORS.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPOR CONCENTRATIONS BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT DEEP VAPOR CONCENTRATIONS BELOW LISTED LEVELS MECHANICAL EXHAUSE IS REQUIRED.

PROTECTIVE GLOVES
IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION
USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE READILY AVAILABLE. USE CHEMICAL REISTANT APRON, BOOTS OR OTHER CLOTHING NEEDED TO AVOID REPEATED OR FREQUENT SKING CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HANDS BEFORE AND AFTER EATING, SMOKING AND USING THE BATHROOM.

====================== SECTION IX - DISCLAIMER ========================

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OF COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF

SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SILICONE POLY PLUS CLEAR DEEP TINT	**HMIS CODES:**	**H**	**F**	**R**	**P**
PRODUCT CODE: SA-3		2	2	0	G

==================== SECTION I -- MANUFACTURER IDENTIFICATION ====================

MANUFACTURER'S NAME:	AMTECO, INC.,		
TECHNICAL INFORMATION:	FIBER SAVER COATINGS, Inc., 5360 EASTGATE MALL, STE #F, SAN DIEGO, CA 92121		
EMERGENCY PHONE:	800-424-9300	DATE REVISED:	01-08-98
INFORMATION PHONE:	858-558-0800	NAME OF PREPARER:	N/A
DOT CLASSIFICATION:	COMBUSTIBLE LIQUID, NOS NA 1993, PG III ERG GUIDE 128		

============== SECTION II -- HAZARDOUS INGREDIENTS / SARA III INFORMATION ===============

		OCCUPATIONAL EXPOSURE LIMITS			VAPOR PRESSURE		WEIGHT
HAZARDOUS COMPONENTS	CAS NUMBER	OSHA PEL	ACGIN TLV	LDSO RATS	mm HG @	TEMP	PERCENT
*XYLOL / XYLENE	1330-20-7	100PPM	100PPM	4.30 G/KG	9.5	106°F	1
*SOLVENT NAPTHA (PETROLEUM) LIGHT AROMATIC	64742-95-6	200PPM	200PPM	4.7 G/KG	12.4	230°F	7
*COBALT DRIER 12%	7440-048-4	0.1 mg/m3	0.1mg/m3	>25ml/kg	2.7	68°F	0.15

*Indicates toxic chemical(s) subject to the reporting requirements of Section 313 of Title III and of 40 CFR 372.

===============SECTION III PHYSICAL/CHEMICAL CHARACTERISTICS==================

BOILING RANGE:	248 to 300 Deg F	SPECIFIC GRAVITY (H20=1):	.955
VAPOR DENSITY:	HEAVIER THAN AIR	EVAPORATION RATE:	SLOWER THAN ETHER
COATING V.O.C. :	2.89 LB /GL (347 G/L)	MATERIAL V.O.C.:	2.89 LB/GL (347 G/L)

SOLUBILITY IN WATER: NON SOLUBLE

APPEARANCE AND ODOR: CLEAR LIQUID, MILD SOLVENT ODOR

================= SECTION IV FIRE AND EXPLOSION HAZARD DATA ====================

FLASH POINT: 82 Deg F METHOD USED: TCC.

FLAMMABLE LIMITS IN AIR BY VOLUME-- LOWER: 1.0% UPPER: 6.6%

EXTINGUISHING MEDIA: FOAM, C02, DRY CHEMICAL

<u>SPECIAL FIREFIGHTING PROCEDURES</u>:

ALL FIRIFIGHTING PPERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER SHOULD BE USED TO COOL EXPOSED CONTAINERS.

<u>UNUSUAL FIRE AND EXPLOSION HAZARDS:</u>

KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

========================= SECTION V REACTIVITY DATA ==============================

STABILITY: STABLE

CONDITIONS TO AVOID:
EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID):
NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS:
CARBON MONOXIDE, CARBON DIOXIDE, SKOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
NONE

========================SECTION VI HEALTH HAZARD DATA=============================

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)
CHRONIC EXPOSURE MAY CAUSE LIVER AID KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWNG EFFECT: CARDIAC ABNORMALITIES

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? YES OSHA REGULATED? NO
NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURE
INHALATION: MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT: WASH WITH SOAP & WATER.
EYE CONTACT: FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION: DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY

=============== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ====================

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. AVOID BREATING VAPORS. VENTILATE AREA. REMOVE WITH INERT MATERIAL.

WASTE DISPOSAL METHOD
INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE, AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY

====================== SECTION VIII CONTROL MEASURES ===========================

RESPIRATORY PROTECTION
ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES
REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION
USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES

======================== SECTION IX DISCLAIMER ==============================

DISCLAIMER
TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

AWR2SALVOC
06/18/99

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: VOC SATIN ACRYLIC LACQUER
PRODUCT CODE: AWR2SALVOC

HMIS CODES: H F R
2 3 0

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: AMTECO, INC., PACIFIC, MO
TECHNICAL INFORMATION: FSC COATINGS, INC.
5360 EASTGATE MALL ROAD, STE. F
SAN DIEGO, CA 92121
EMERGENCY PHONE: 800-424-9300
INFORMATION PHONE: 619-558-0800
DATE PRINTED: 06/18/99
NAME OF PREPARER: N/A

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT
SOLVENT NAPHTHA(PETROLEUM) LIGHT AROMATIC OSHA PEL: 200PPM, ACGIH TLV: 200PPM	6474-95-6	50
* TETRACHLOROETHYLENE OSHA PEL: 100PPM, ACGIH TLV: 100PPM	127-18-4	17.71
2-PROPANONE OSHA PEL: 750 PPM TWA 1000 PPM STEL ACGIH TLV:750 PPM TWA 1000 PPM STEL	67-64-1	10

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.
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SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 133 F - 300-355 F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 5.63 lb/gl
SOLUBILITY IN WATER: INSOLUBLE
APPEARANCE AND ODOR: CLEAR LIQUID STRONG SOLVENT ODOR
SPECIFIC GRAVITY (H2O=1): 1.03
EVAPORATION RATE: SLOWER THAN ETHER
MATERIAL V.O.C.: 4.31 lb/gl

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 35 F
METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1
UPPER: 12.8

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
WEAR A SELF-CONTINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WITH APPROPRIATE TURN-OUT GEAR AND CHEMICAL RESISTANT PERSONAL PROTECTIVE EQUIPMENT.

UNUSUAL FIRE AND EXPLOSION HAZARDS
WATER MAY BE USED TO COOL CONTAINERS. VAPORS MAY CAUSE FLASH FIRES. KEEP CONTAINERS TIGHTLY CLOSED AND ISOLATE FROM HEAT, SPARKS AND FLAME. NEVER USE WELDING OR CUTTING TORCH ON OR NEAR CONTAINERS EVER IF EMPTY. RESIDUE CAN STILL IGNITE.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID

AVOID CONTACT WITH STRONG OXIDIZERS, HIGH TEMPERATURES AND OPEN IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID)

OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

CARBON DIOXIDE, CARBON MONOXIDE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

INHALATION OF VAPOR OR MIST CAN CAUSE HE FOLLOWING:

IRRITATION TO THE UPPER RESPIRATORY TRACT, MAY CAUSE NAUSEA, HEADACHE, FATIGUE, LOSS OF APPETITE. HIGH CONCENTRATIONS CAN CAUSE COLLAPSE, BRONCHITIS, PNEUMONIA AND CONVULSIONS.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

SKIN: CAN CAUSE IRRITATION. CAN CAUSE DEFATTING OF SKIN, WHICH CAN LEAD TO DERMITITIS.

EYE: LIQUID AND VAPOR CAN BE IRRITATING TO EYES. SYMPTOMS INCLUDE TEARING, REDNESS AND DISCOMFORT.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

THIS PRODUCT IS NOT EASILY ABSORBED. PROLONGED CONTACT MAY RESULT IN THE EXTRACTION OF NATURAL OILS CAUSING IRRITATION AND DRYNESS.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

TOXIC IF SWALLOWED. WILL CAUSE VOMITING, NAUSEA, DIARRHEA. HIGH CONCENTRATRTIONS CAN CAUSE COLLAPSE, PNEUMOLNIAAND CONVULSIONS.

HEALTH HAZARDS (ACUTE AND CHRONIC)

BREATHING DIFFICULTIES, DIZZINESS, LOSS OF COORDINATION AND HEADACHE ARE SIGNS OF EXPOSURE TO CONSENTRATIONS ABOVE THE TLV.

REPORTS HAVE ASSOCIATED REPEATED AND PROLONGED OCCUPATIONAL OVEREXPOSURE WITH PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.

INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS MAY BE HARMFUL OR FATAL.

CARCINOGENICITY: NTP CARCINOGEN: N/A IARC MONOGRAPHS: Yes OSHA REGULATED: N/A N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

PRE-EXISTING DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, NERVOUS SYSTEM, RESPIRATORY AND/OR PULMONARY SYSTEM, LUNG(E.G. ASTHMA-LIKE CONDISITONS).

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: MOVE SUBJECT TO FRESH AIR. RESTORE BREATHING IF NECESSARY. TREAT SYMPTOMATICALLY AND CONSULT PHYSICIAN. EYE & SKIN CONTACT:FLUSH EYES WITH LARGE AMOUNT OF WATER FOR ATLEAST 15 MINUTES. SEE A PHYSICIAN IMMEDIATELY. WASH SKIN AFTER REMOVING CONTAMINATED CLOTHING WITH MILD SOAP AND WATER FOR 15 MINUTES. SEE PHYSICIAN IF IRRITATION PERSISTS. INGESTION: DRINK 1-2 GLASSES OF WATER TO

DILUTE. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. TREAT SYMPTOMATICALLY. NEVER GIVE LIQUIDS TO AN UNCONSCIOUS PERSON.

========= SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ============

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
STOP SPILL AT SOURCE. ELIMINATE ALL IGNITION SOURCES(FLARES, OPEN FLAMES, PILOT LIGHTS, ELECTRICAL SPARKS). USE ONLY NON SPARKING TOOLS FOR CLEAN UP. SUPPLY ADEQUATE VENTILATION. AVOID BREATHING OF VAPORS, USE RESPIRATOR. CONTAIN AND REMOVE WITH INERT ABSORBENT.

WASTE DISPOSAL METHOD
DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP ALL CONTAINERS TIGHT AND IN AN UPRIGHT POSITION TO PREVENT LEAKS. STORE CONTAINERS OUT OF SUN AND AWAY FROM ALL HEAT SOURCES. THIS MATERIAL SHOULD BE GROUNDED WHEN POURING. DO NOT STORE NEAR HEAT, SPARKS OR OPEN FLAME.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

==================== SECTION VIII - CONTROL MEASURES =====================

RESPIRATORY PROTECTION
DO NOT BREATHE VAPORS OR SPRAY MIST. WEAR AN APPROPRIATE, PROPERLY FITTED RESPIRATOR (NIOSH/MSHA APPROVED) DURING APPLICATION AND OTHER USE OF THIS MATERIAL UNTIL VAPORS AND MISTS ARE EXHAUSTED AND EXPOSURE IS BELOW LISTED V(S). USE APPROVED CHEMICAL/CECHANICAL FILTERS DESIGNED TO REMOVE A MBINATION OF PARTICLES AND VAPORS.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPOR CONCENTRATIONS BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT DEEP VAPOR CONCENTRATIONS BELOW LISTED LEVELS MECHANICAL EXHAUSE IS REQUIRED.

PROTECTIVE GLOVES
IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION
USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE READILY AVAILABLE. USE CHEMICAL REISTANT APRON, BOOTS OR OTHER CLOTHING NEEDED TO AVOID REPEATED OR FREQUENT SKING CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HANDS BEFORE AND AFTER EATING, SMOKING AND USING THE BATHROOM.

======================== SECTION IX - DISCLAIMER ==========================

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. I EVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OF COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: HIGH SOLIDS QD VARNISH
PRODUCT CODE: 102-22

HMIS CODES: H F R P
2 3 0 G

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: AMTECO, INC., PACIFIC, MO
TECHNICAL INFORMATION: FSC COATINGS, INC.
5360 EASTGATE MALL ROAD, STE. F, San Diego CA 92121
EMERGENCY PHONE: 800-424-9300
INFORMATION PHONE: 858-558-0800
DATE PRINTED: 10/01/99
NAME OF PREPARER: N/A

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT
SOLVENT NAPHTHA(PETROLEUM), LIGHT ALIPHATIC OSHA PEL: 500PPM, ACGIH TLV: 300PPM	64742-89-8	30
SOLVENT NAPTHA (PETROLEUM) MEDIUM ALIPHATIC OSHA PEL: 500PPM, ACGIH TLV: 100PPM	64742-88-7	20

N/A
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SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 247-282 F - 324-402 F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 3.62 lb/gl
SOLUBILITY IN WATER: INSOLUBLE
APPEARANCE AND ODOR:

SPECIFIC GRAVITY (H2O=1): 0.87
EVAPORATION RATE: SLOWER THAN ETHER
MATERIAL V.O.C.: 3.62 lb/gl

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 55
METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1
UPPER: 7

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
WEAR A SELF-CONTINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WITH APPROPRIATE TURN-OUT GEAR AND CHEMICAL RESISTANT PERSONAL PROTECTIVE EQUIPMENT.

UNUSUAL FIRE AND EXPLOSION HAZARDS
WATER MAY BE USED TO COOL CONTAINERS. VAPORS MAY CAUSE FLASH FIRES. KEEP CONTAINERS TIGHTLY CLOSED AND ISOLATE FROM HEAT, SPARKS AND FLAME. NEVER USE WELDING OR CUTTING TORCH ON OR NEAR CONTAINERS EVER IF EMPTY. RESIDUE CAN STILL IGNITE.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID
AVOID CONTACT WITH STRONG OXIDIZERS, HIGH TEMPERATURES AND OPEN IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID)
OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON DIOXIDE, CARBON MONOXIDE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

==================== SECTION VI - HEALTH HAZARD DATA =====================

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
INHALATION OF VAPOR OR MIST CAN CAUSE HE FOLLOWING: IRRITATION TO THE UPPER RESPIRATORY TRACT, MAY CAUSE NAUSEA, HEADACHE, FATIGUE, LOSS OF APPETITE. HIGH CONCENTRATIONS CAN CAUSE COLLAPSE, BRONCHITIS, PNEUMONIA AND CONVULSIONS.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
SKIN: CAN CAUSE IRRITATION. CAN CAUSE DEFATTING OF SKIN, WHICH CAN LEAD TO DERMITITIS.
EYE: LIQUID AND VAPOR CAN BE IRRITATING TO EYES. SYMPTOMS INCLUDE TEARING, REDNESS AND DISCOMFORT.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
THIS PRODUCT IS NOT EASILY ABSORBED. PROLONGED CONTACT MAY RESULT IN THE EXTRACTION OF NATURAL OILS CAUSING IRRITATION AND DRYNESS.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
TOXIC IF SWALLOWED. WILL CAUSE VOMITING, NAUSEA, DIARRHEA. HIGH CONCENTRATRTIONS CAN CAUSE COLLAPSE, PNEUMOLNIAAND CONVULSIONS.

HEALTH HAZARDS (ACUTE AND CHRONIC)
BREATHING DIFFICULTIES, DIZZINESS, LOSS OF COORDINATION AND HEADACHE ARE SIGNS OF EXPOSURE TO CONSENTRATIONS ABOVE THE TLV.
REPORTS HAVE ASSOCIATED REPEATED AND PROLONGED OCCUPATIONAL OVEREXPOSURE WITH PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.
INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS MAY BE HARMFUL OR FATAL.

CARCINOGENICITY: NTP CARCINOGEN: N/A IARC MONOGRAPHS: N/A OSHA REGULATED: N/A N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
PRE-EXISTING DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, NERVOUS SYSTEM, RESPIRATORY AND/OR PULMONARY SYSTEM, LUNG(E.G. ASTHMA-LIKE CONDISITONS).

EMERGENCY AND FIRST AID PROCEDURES
INHALATION: MOVE SUBJECT TO FRESH AIR. RESTORE BREATHING IF NECESSARY. TREAT SYMPTOMATICALLY AND CONSULT PHYSICIAN. EYE & SKIN CONTACT:FLUSH EYES WITH LARGE AMOUNT OF WATER FOR ATLEAST 15 MINUTES. SEE A PHYSICIAN IMMEDIATELY. WASH SKIN AFTER REMOVING CONTAMINATED CLOTHING WITH MILD SOAP AND WATER FOR 15 MINUTES. SEE PHYSICIAN IF IRRITATION PERSISTS. INGESTION: DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. TREAT SYMPTOMATICALLY. NEVER GIVE LIQUIDS TO AN UNCONSCIOUS PERSON.

=========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ============

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

STOP SPILL AT SOURCE. ELIMINATE ALL IGNITION SOURCES(FLARES, OPEN FLAMES, PILOT LIGHTS, ELECTRICAL SPARKS). USE ONLY NON SPARKING TOOLS FOR CLEAN UP. SUPPLY ADEQUATE VENTILATION. AVOID BREATHING OF VAPORS, USE RESPIRATOR. CONTAIN AND REMOVE WITH INERT ABSORBENT.

WASTE DISPOSAL METHOD

DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

KEEP ALL CONTAINERS TIGHT AND IN AN UPRIGHT POSITION TO PREVENT LEAKS. STORE CONTAINERS OUT OF SUN AND AWAY FROM ALL HEAT SOURCES. THIS MATERIAL SHOULD BE GROUNDED WHEN POURING. DO NOT STORE NEAR HEAT, SPARKS OR OPEN FLAME.

OTHER PRECAUTIONS

DO NOT TAKE INTERNALLY.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION

DO NOT BREATHE VAPORS OR SPRAY MIST. WEAR AN APPROPRIATE, PROPERLY FITTED RESPIRATOR (NIOSH/MSHA APPROVED) DURING APPLICATION AND OTHER USE OF THIS MATERIAL UNTIL VAPORS AND MISTS ARE EXHAUSTED AND EXPOSURE IS BELOW LISTED TLV(S). USE APPROVED CHEMICAL/CECHANICAL FILTERS DESIGNED TO REMOVE A COMBINATION OF PARTICLES AND VAPORS.

VENTILATION

PROVIDE SUFFICIENT VENTILATION TO KEEP VAPOR CONCENTRATIONS BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT DEEP VAPOR CONCENTRATIONS BELOW LISTED LEVELS MECHANICAL EXHAUSE IS REQUIRED.

PROTECTIVE GLOVES

IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION

USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

EYE BATH AND SHOWERS SHOULD BE READILY AVAILABLE. USE CHEMICAL REISTANT APRON, BOOTS OR OTHER CLOTHING NEEDED TO AVOID REPEATED OR FREQUENT SKING CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES

WASH HANDS BEFORE AND AFTER EATING, SMOKING AND USING THE BATHROOM.

SECTION IX - DISCLAIMER

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OF COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SHAKE & SHINGLE SEALANT   HMIS CODES: H F R P
PRODUCT CODE: TKP-200SER   2 2 0 G

================== SECTION I - MANUFACTURER IDENTIFICATION ================

MANUFACTURER'S NAME: AMTECO INC
ADDRESS: Fiber Saver Coatings, Inc. • San Diego, CA • (619) 558-0800
EMERGENCY PHONE: 1-800-424-9300   INFORMATION PHONE: 1-800-969-4811
DATE REVISED : 01-05-98   NAME OF PREPARER :

DOT CLASSIFICATION: Combustible Liquid NOS, NA 1993, PGIII

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION =========

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	LD50 RATS	VAPOR PRESSURE mm Hg @ TEMP	WEIGHT PERCENT
SOLVENT NAPTHA(PETROLEUM)MEDIUM ALIPHATIC	64742-88-7	500PPM	100PPM	>25ML/KG	5.0 100F	< 5.0%

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***
THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

============== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS =============

BOILING POINT: 323 Deg F   SPECIFIC GRAVITY (H2O=1): 0.9
VAPOR DENSITY: HEAVIER THAN AIR   EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 0.46 LB/GL (55 G/L)
MATERIAL V.O.C.: 0.46 LB/GL (55 G/L)
SOLUBILITY IN WATER: NON SOLUBLE
APPEARANCE AND ODOR: AMBER, BROWN OR GRAY LIQUID MILD SOLVENT ODOR

================ SECTION IV - FIRE AND EXPLOSION HAZARD DATA ===============

FLASH POINT: 111 Deg F   METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1.0% UPPER: 7.0%

EXTINGUISHING MEDIA: FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL

SPECIAL FIREFIGHTING PROCEDURES

ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER MAY BE INEFFECTIVE BUT SHOULD BE USDED TO COOL EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS

KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID
EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)
NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON MONOXIDE, CARBON DIOXIDE, SMOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
NONE

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
DANGER CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE. MODERATELY IRRITATING TO SKIN.MAY CAUSE ALLERGIC SKIN REACTION.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)
CHRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWING EFFECT:CARDIAC ABNORMALITIES.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? NO
NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES
INHALATION; MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

REMOVE ALL SOURCES OF IGNITION. AVOID BREATHING VAPORS. VENTILATE AREA. REMOVE WITH INERT MATERIAL. TOXIC TO FISH. KEEP OUT OF PONDS. STREAMS, LAKES, AND ANY OTHER WATERWAYS.

WASTE DISPOSAL METHOD

DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

KEEP AWAY FROM HEAT. SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS

DO NOT TAKE INTERNALLY.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION

ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION

PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES

REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION

USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES

WASH HAND BEFORE EATING, SMOKING OR USING WASHROOM.

SECTION IX - DISCLAIMER

DISCLAIMER

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: TNP-300 SERIES DECK&FURNITURE

PRODUCT CODE: TWF-300SER

HMIS CODES:	H	F	R	P
	2	2	0	G

================== SECTION I - MANUFACTURER IDENTIFICATION ==================

MANUFACTURER'S NAME: AMTECO INC.
ADDRESS: Fiber Saver Coatings, Inc. • San Diego, CA • (619) 558-0800
EMERGENCY PHONE: 1-800-424-9300 INFORMATION PHONE: 1-800-969-4811
DATE REVISED : 01-05-98 NAME OF PREPARER :
DOT CLASSIFICATION: Combustible Liquid NOS,NA 1993, PGIII

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION =========

		OCCUPATIONAL EXPOSURE LIMITS			VAPOR PRESSURE		WEIGHT
HAZARDOUS COMPONENTS	CAS NUMBER	OSHA PEL	ACGIH TLV	LD50 RATS	mm Hg	@ TEMP	PERCENT
SOLVENT NAPTHA(PETROLEUM)MEDIUM ALIPHATIC	64742-88-7	500PPM	100PPM	>25ML/KG	5.0	100F	35
*COBALT DRIER 12%	7440-048-4	0.1 mg/m3	0.02 mg/m3	>25 ML/KG	2.7	68F	0.13

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

============== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS =============

BOILING RANGE: 248 to 323 Deg F SPECIFIC GRAVITY (H2O=1): 0.9
VAPOR DENSITY: HEAVIER THAN AIR EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 2.90 LB/GL (348 G/L)
MATERIAL V.O.C.: 2.90 LB/GL (348 G/L)
SOLUBILITY IN WATER: NON SOLUBLE
APPEARANCE AND ODOR: VARY COLOR-MILD SOLVENT ODOR

================ SECTION IV - FIRE AND EXPLOSION HAZARD DATA ================

FLASH POINT: 111 Deg F METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1.0% UPPER: 7.0%

EXTINGUISHING MEDIA: FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL

SPECIAL FIREFIGHTING PROCEDURES

ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER MAY BE INEFFECTIVE BUT SHOULD BE USDED TO COOL EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS

KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID

EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)

NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

CARBON MONOXIDE, CARBON DIOXIDE, SMOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

NONE

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE SEVERE IRRITATION, RENESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)

CHRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWING EFFECT:CARDIAC ABNORMALITIES.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? YES OSHA REGULATED? NO

NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES

INHALATION; MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

=========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ===========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

[illegible]E ALL SOURCES OF IGNITION. AVOID BREATHING VAPORS. VENTILATE AREA. REMOVE WITH INERT MATERIAL. THIS MATERIAL IS TOXIC TO FISH. DO NOT POLLUTE WATERWAYS.

WASTE DISPOSAL METHOD

INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE, AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS

DO NOT TAKE INTERNALLY.

===================== SECTION VIII - CONTROL MEASURES =====================

RESPIRATORY PROTECTION

ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION

PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES

REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION

USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES

WASH HAND BEFORE EATING, SMOKING OR USING WASHROOM.

========================= SECTION IX - DISCLAIMER =========================

DISCLAIMER

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MATERIAL SAFETY DATA SHEET

PRODUCT NAME: TWP-500 SERIES VOC COMPLIANT
PRODUCT CODE: TWP-500SER

HMIS CODES:	H	F	R	P
	2	2	0	G

================== SECTION I - MANUFACTURER IDENTIFICATION ==================

MANUFACTURER'S NAME: AMTECO INC.
ADDRESS: Fiber Saver Coatings, Inc. • San Diego, CA • (619) 558-0800
EMERGENCY PHONE: 1-800-424-9300
INFORMATION PHONE: 1-800-969-4811
DATE REVISED : 01-05-98
NAME OF PREPARER :
DOT CLASSIFICATION: Combustible Liquid NOS, NA1993, PGIII

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION =========

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	LD50 RATS	VAPOR PRESSURE mm Hg	@ TEMP	WEIGHT PERCENT
SOLVENT NAPTHA(PETROLEUM)MEDIUM ALIPHATIC	64742-88-7	500PPM	100PPM	>25ML/KG	5.0	100F	30
TEXANOL ESTER-ALCOHOL	25265-77-4				1.0	183F	< 5.0%

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

============== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS =============

BOILING RANGE: 323 to 471 Deg F
SPECIFIC GRAVITY (H20=1): 0.9
VAPOR DENSITY: HEAVIER THAN AIR
EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 2.56 LB/GL (307 G/L)
MATERIAL V.O.C.: 2.51 LB/GL (301 G/L)
SOLUBILITY IN WATER: NON SOLUBLE
APPEARANCE AND ODOR: AMBER,BROWN LIQUID, VERY MILD SOLVENT ODOR

================ SECTION IV - FIRE AND EXPLOSION HAZARD DATA ===============

FLASH POINT: 111 Deg F
METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.6% UPPER: 7.0%

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL

SPECIAL FIREFIGHTING PROCEDURES

ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER MAY BE INEFFECTIVE BUT SHOULD BE USDED TO COOL EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS

KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

======================== SECTION V - REACTIVITY DATA ========================

STABILITY: STABLE

CONDITIONS TO AVOID

EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)

NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

CARBON MONOXIDE, CARBON DIOXIDE, SMOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

NONE

===================== SECTION VI - HEALTH HAZARD DATA =====================

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE SEVERE IRRITATION, RENESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)

CHRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWING EFFECT:CARDIAC ABNORMALITIES.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? NO

NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES

INHALATION; MOVE TO FRESH AIR, GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

=========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ===========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. AVOID BREATHING VAPORS, VENTILATE AREA. REMOVE WITH INERT MATERIAL. THIS MATERIAL IS TOXIC TO FISH. DO NOT POLLUTE WATERWAYS.

WASTE DISPOSAL METHOD
INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE, AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

===================== SECTION VIII - CONTROL MEASURES =====================

RESPIRATORY PROTECTION
ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES
REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION
USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HAND BEFORE EATING, SMOKING OR USING WASHROOM.

========================= SECTION IX - DISCLAIMER =========================

DISCLAIMER
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MATERIAL SAFETY DATA SHEET

PRODUCT NAME: GRAFFITI MAX URETHANE
PRODUCT CODE: 2-605

HMIS CODES: H F R P
2 2 0 G

================== SECTION I - MANUFACTURER IDENTIFICATION ===============

MANUFACTURER'S NAME: AMTECO INC.
ADDRESS: AMTECO INC, ST. LOUIS, MO. 63106
EMERGENCY PHONE: 1-800-424-9300
DATE REVISED : 11-18-93
INFORMATION PHONE: 1-800-969-4811
NAME OF PREPARER :

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION =======

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	OTHER	VAPOR PRESSURE mm Hg	@ TEMP	WEIGHT PERCENT
POLYMERIC HEXAMETHYLENE DIISOCYANATE		150 TWA	150 TWA		9.0	68F	55
*AROMATIC HYDROCARBON	64742-95-6	200PPM	200PPM		12.4	230F	32
PROPYLENE GLYCOL METHYL ETHER ACETATE	108-65-6	NE	NE	NE	3.9	77F	< 5.0%

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

============== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS =============

BOILING RANGE: 284 to 300 Deg F
SPECIFIC GRAVITY (H2O=1): 1.0
VAPOR DENSITY: HEAVIER THAN AIR
EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 4.30 LB/GL (515 G/L)
MATERIAL V.O.C.: 4.30 LB/GL (515 G/L)
SOLUBILITY IN WATER: REACTS SLOWLY WITH WATER TO LIBERATE CO2 GAS
APPEARANCE AND ODOR: AMBER LIQUID WITH SLIGHT AROMATIC ODOR

================ SECTION IV - FIRE AND EXPLOSION HAZARD DATA ===============

FLASH POINT: 110 Deg F
METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1.0% **UPPER:** 10.0%

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES

EMERGENCY EQUIPMENT WITH FULL SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING SHOULD BE WORN BY FIR ,HTERS. DURING A FIRE,MDI VAPORS AND OTHER IRRITATING, HIGHLY TOXIC GASES MAY BE GERNERATED BY COMBUSTION.

UNUSUAL FIRE AND EXPLOSION HAZARDS

AT TEMPERATURES GREATER THAN 400F POLYMERIC MDI CAN POLYMERIZE AND DECOMPOSE WHICH CAN CAUSE PRESSURE BUILD-UP IN CLOSED CONTAINERS. EXPLOSIVE RUPTURE IS POSSIBLE. USE COLD WATER TO COOL FIRE-EXPOSED CONTAINERS.

====================== SECTION V - REACTIVITY DATA ==================

STABILITY: STABLE

CONDITIONS TO AVOID

EXTREME HEAT. CONTAMINATION WITH WATER.

INCOMPATIBILITY (MATERIALS TO AVOID)

WATER, AMINES, STRONG BASES, ALCOHOLS. WILL CAUSE SOME CORROSION TO COPPER ALLOYS AND ALUMINUM.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

BY HIGH HEAT AND FIRE:CARBON MONOXIDE, OXIDES OF NITROGEN, TRACES OF HCN, MDI VAPORS OR AEROSOLS.

HAZARDOUS POLYMERIZATION: MAY OCCUR

CONTACT WITH MOISTURE,OTHER MATERIALS WHICH REACT WITH ISOCYANATES, OR TEMPERATURES ABOVE 400F MAY CAUSE POLYMERIZATION.

==================== SECTION VI - HEALTH HAZARD DATA =====================

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE BURNING SENSATION OF THE MUCOUS MEMBRANES IN THE RESPIRATORY TRACT(NOSE, THROAT, LUNGS) CAUSING RUNNY NOSE, SORE THROAT, COUGHING, CHEST DISCOMFORT, SHORTNESS OF BREATH AND REDUCED LUNG FUNCTION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

SKIN-REDDENING, SWELLING, RASH, SCALING OR BLISTERING. CURED MATERIAL IS HARD TO REMOVE.
EYES-TEARING, REDDENING, AND SWELLING.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE SWELLING, RASH, SCALING, BLISTERING. AND IN SOME CASES, SKIN SENSITIZATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE IRRITATION AND CORROSIVE ACTION IN THE MOUTH, STOMACH TISSUE AND DIGESTIVE TRACT. SYMPTOMS CAN INCLUDE SORE THROAT, ABDOMINAL PAIN, NAUSEA, VOMITING AND DIARRHEA.

HEALTH HAZARDS (ACUTE AND CHRONIC)

OVER EXPOSURE CAN LEAD TO BRONCHITIS, BRONCHIAL SPASM AND PULMONARY EDEMA (FLUIDS IN THE LUNGS). THESE EFFECTS ARE USUALLY REVERSIBLE. CHEMICAL OR HYPERSENSITIVITY PNEUMONITIS HAS ALSO BEEN REPORTED. CHEMICAL ASTHMA IS ALSO POSSIBLE.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? YES

NOT LISTED BY NTP, IARC OR REGULATED BY OSHA AS CARCINOGENS.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

ASTHMA, BRONCHITIS, EMPHYSEMA, BRONCHIAL HYPERREACTIVITY, SKIN ALLERGIES, ECZEMA

EMERGENCY AND FIRST AID PROCEDURES

EYES:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES, WHILE HOLDING EYELIDS AOPEN ALL THE TIME.
SKIN-WASH EFFECTED AREA WITH SOAP AND WATER.
INHALATION-MOVE TO FRESH AIR. CONSULT PHYSICIAN IF ASTHMATIC SYMPTOMS OCCUR.
INGESTION-DO NOT INDUCE VOMITING. GIVE 1 TO 2 CUPS OF MILK OR WATER TO DRINK. DO NOT GIVE ANYTHING NBY MOUTH TO AN UNCONSCIOUS PERSON. CONSULT PHYSICIAN IMMEDIATELY.

FSC Coatings

Coatings Engineered For Ultimate Performance

California Air Resources Board Meeting

Comments On

Suggested Control Measure For Architectural Coatings

September 21, 1999

Topics For Discussion:

I. **Industrial Maintenance Coatings** -- 250 vs. 420 g/l For Air Dry Primers & Topcoats

No Equivalent Performance Replacements -- Not Water-bornes or Nor Multi-Components

A. Are We Purposefully Or Accidentally Eliminating Air Dry Systems? If so, why?
  1) What about health benefits of single component systems vs. body tissue reactive components in common 2 component high performance systems?
  2) What about renewable resource use in air dry resin systems?
  3) What about ease of use and ease of maintenance? Recoatability?
  4) What are you being told are the replacements and their performance?
  5) What are the life cycle costs? Life cycle emissions of more frequent recoats with shorter lives?
  6) What are the costs of lost business to other states & other countries with lower emission standards?

rimer Performance Comparison: **Salt Fog Tests For Primers** (See Chart)
  1) State Of Technology Of Air Dry Systems -- Zero-Rust @ 2400 Hours On Brush Finished & Rusty Surfaces With Zero Scribe Creep
  2) **Water-bornes Have 5-20% Longevity** Of New Zero-Rust Solvent-borne Technology
  3) Zero-Rust Represents The State-Of-The-Art For Air Dry Systems -- higher performance than **solvent borne epoxies** (including epoxy mastics) with less than ideal surface preparation including **smooth steel and rusty surfaces.**
  4) **High Temperature Resistance** Than Epoxies -- greater than 350 degrees F;
    -Vandenberg Missile Launch Facilities
    -Indonesian Geothermal Plant

[redacted]

  6) **Eliminates The Need For Costly White Metal & Near White Metal Blasts**

ESC Coatings *(cont)*

C. Topcoats Performance Comparison:

1) ***Weatherometer* – 88-97% gloss retention at 1600 hrs for single component SA-3**
   70-80% gloss retention for 2 component industrial urethanes

2) ***Direct Impact* – 150-160 inch-lbs for SA-3;**
   130-140 inch-lbs for common industrial urethanes

3) ***Reverse Impact (best adhesion measure)* –**
   135-150 inch-lbs for SA-3;
   5-50 inch-lbs for industrial urethanes

4) ***Recoatability and ease of maintenance* – *superior for single component, SA-3 materials***

5) ***Maintain 420 g/l for maximum performance and acceptable cure times***

**<u>*Recommendation: Allow increased VOC levels for these higher performance maintenance systems to survive at state-of-the-art performance levels:*</u>
- Primers – 300 g/l or higher
- Topcoats – 400 g/l or higher for mild solvents with higher flash points
350 g/l or higher for stronger solvent systems

II. *Acrylic Lacquers For Sealing Concrete, Pavers and Roadbases – 550 g/l or above desired*

No Performance Equivalent
- *-Epoxies Chalk & Lack Adhesion On Surfaces With Marginal Profile*
- *-Urethanes Lack Adhesion & Are Slippery*
- *-Water-borne Too Soft For Hot Tire Traffic*

Example Projects:
- *-Highway 111 Roadbase & Sidewalks – Sheen present applied 7 years ago*
- *-San Francisco's Famed Pier 39 – Still beads water after 7 years*

250% cost increase to make 400 g/l formula vs. Standard Formula
150% cost increase to make 550 g/l formula vs. Standard Formula

**<u>*Recommendation: Make lacquer definition include these systems that can also be used for concrete, stone and other masonry surfaces for 550 g/l limit to apply.*</u>

III. <u>*Floor Coatings – What Is This Really?*</u>

Implies 100 % Solids Technology – Legislates in Epoxy & Urethanes As Only Qualifiers
Low Adhesion For Multi component Systems Unless Sandblasted or Beadblasted – very expensive
Lower Solids Sealer/Primers Needed For Proper Adhesion – 350 g/liter With Current

__ESC Coatings (cont)__

Solvents; 250 g/l With T-Butyl Acetate
Questionable Maintainability & Recoatability

To Achieve Higher Solids At Useable Viscosities & More Reasonable Cure Rates
- *Must Lower The Molecular Weights Of The Molecules Involved*
- *Urethanes, Alkyds, Acrylics, Epoxies, etc.*
- *Like Using Molecules That Have Aged 2-4 Years Before Putting Into Service*

What Is The Real Cost Of Using These "Pre-Aged Systems"?
- *Initial Cost*
- *More Frequent Applications*
- *Work Force Qualifications -- Very Questionable*

__Recommendation: Keep VOC's at 350 g/l For Urethane & Epoxy Sealers And Topcoats__ -- Single & Multi component

III. __New__ Quick Dry Varnish Technology vs. Nitrocellulose Lacquers --
Very Quick Dry -- 10-20 minutes dry time
Superior Performance -- Enhanced UV & Water Resistance
Same Ease of Application,
Superior Health Benefits -- mild solvents
Higher Flash Point
Need Similar VOC Limits -- 350 g/l too low
450 g/l VOC needed

IV. __Wood Stains__ --
What Are You Targeting Here?
Oil Stains Preferred -- 350 g/l marginal now for reasonable cure rates
We Are #1 In This Area -- See Test Results
Penetration Of Up to 1" In Aged Wood -- Cedar & Redwood
Water-borne Alkyds Unstable -- Cannot Penetrate Like Oil-Borne Counterparts.

*__**Recommendation: Keep the 350 g/l VOC__ to minimize life cycle costs, wood replacement and life cycle emissions.*

V. __Specialty Coatings__ -- High Performance Anti-Graffiti
Lower Solids Systems More Chemical Resistant & Higher Color Retention
Low Volume Systems
Used Mostly By Schools And Governments

__Recommendation: Keep VOC At 550 g/l or higher.__

VI. __Solvent Selection__ -- Strength & Safety
Need Strong, High Flash Point Solvents For Safe Products
Keep Perchloroethylene (Perc)
Add T-Butyl Acetate -- 80 degree F Flash Point

Henry
COMPANY

10 March 2000

Mr. Jim Nyarady
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Sent via e-mail to jnyarady@arb.ca.gov. with hardcopy overnight

Re: Proposed SCM VOC limit for asphaltic primers for roof coatings

Dear Mr. Nyarady:

As we discussed in our meeting with the CARB staff on 18 January, Henry Company does not believe that functional asphaltic primers can be formulated at the proposed VOC limits, which are much below those in effect in SCAQMD today.

Purpose of Asphaltic Primer

8a-1 Asphaltic primers are used to prepare an otherwise cleaned roof surface for the application of an asphaltic coating. The key performance requirements are to use a compatible asphalt and to have a low viscosity at low temperatures (jobs are primed first thing in the morning). Thus the primer:

- wets out any residual dust
- wets any metal surfaces
- penetrates a porous roof surface (wood or concrete roof deck, old roof membrane, etc.), and
- leaves a very thin asphalt film which is compatible with the coating to be applied.

Reducing the VOC content of the primer rapidly increases the viscosity, especially at cold temperatures. Keeping the viscosity at even semi-acceptable levels requires reducing the quality of the asphalt, transitioning from pure air-blown roofing asphalt to blends with softer asphalts and perhaps asphaltic oils. Changing the bitumen this way prolongs the drying time and eventually creates a surface which is incompatible with the coating, thus causing coating failures.

Viscosity vs Temperature Data

Attached is an Excel spreadsheet ["CARB_primers.xls"] which shows the viscosities of several primers versus temperature. These samples include a D-41 compliant, 500 g/l primer as a control, commercially available primers from Henry and several other manufacturers which comply with the SCAQMD Rule 1113 (350 g/l) in effect today, and the low VOC cutback we showed you in January. Note that the viscosities shown here were measured with a Brookfield viscometer, which uses different units than the Saybolt viscosities presented in RCMA's data.

As you can see:

- None of the alternate primers come within a factor of 10 of the viscosity of the control; most are ~100 times heavier.

- None of the products comply with the even lower VOC limits proposed in the draft SCM.

8a-1

Primer with a viscosity at the application temperature below ~200 – 400 centipoise is acceptable. As you saw at our demonstration, the higher viscosity makes it more difficult to apply and leaves a heavier applied film. This adds more solvent to the surface, delays the job by prolonging the dry time of the primer, and may contribute to the functional problems seen with some of the low-VOC primers.

Primer – Induced Failures

Last January you asked whether we could document performance problems of roof coatings when applied over low-VOC primers.

Attached are photographs of a roof test we performed last spring on our plant roof in Huntington Park. The test bed was an old emulsion-coated roof membrane. This surface was cleaned and primed with ~4' wide stripes of four different primers, running cross-wise in the photo ["primer_test.jpg"]. After the primers had dried completely, this area was then coated with two different aluminum roof coatings, "A" and "B," running up and down in the photo.

Stacked from top to bottom in the photo, the primers were "3," "5," "4," and "11." "3" and "11" are two of the 350 g/l primers shown in the viscosity charts, while "4" and "5" are D-41 compliant primers.

The photos were taken when the coatings were about 9 months old. As you can see in the first photo and in ["prim_tst_4_v_11_far" and "prim_tst_4_v_11_closeup"], both aluminum coatings over the "11" primer are alligatoring and failing badly. We speculate that this is because a non-airblown asphalt was used. The same problem is occurring over the "3" primer ["prim_tst_3_v_5_closeup"], although so far to a much lesser extent.

Exempt Solvents

The only "non-ozone depleting" exempt solvent in Section 2.57 into which asphalt will dissolve is parachlorobenzotrifluoride, sold under the trade name Oxsol® 100.

This solvent presents some problems if used in a roofing primer:

8a-2

- The solvent has an offensive odor – a combination of toluene and mothballs. In a time where the odor of ordinary mineral spirits causes complaints, this will not be acceptable on many job sites.
- The solvent is extremely expensive, roughly $30 per gallon in drums. [I don't believe that anyone makes enough asphalt primer to be able to dedicate a new solvent tank to the product.] A gallon of primer at the proposed limits will require ~1/2 gallon of exempt solvent, which will increase the cost of the material by more than a factor of 10.

For these reasons, we do not believe that the use of exempt solvents provides a practical means of meeting the proposed new limits.

If you have any questions, please call me at (323) 908-5279. Note that this is a new direct-dial phone number.

Paul A Beemer

Paul A. Beemer
Technical Director, Coatings Division
Henry Company

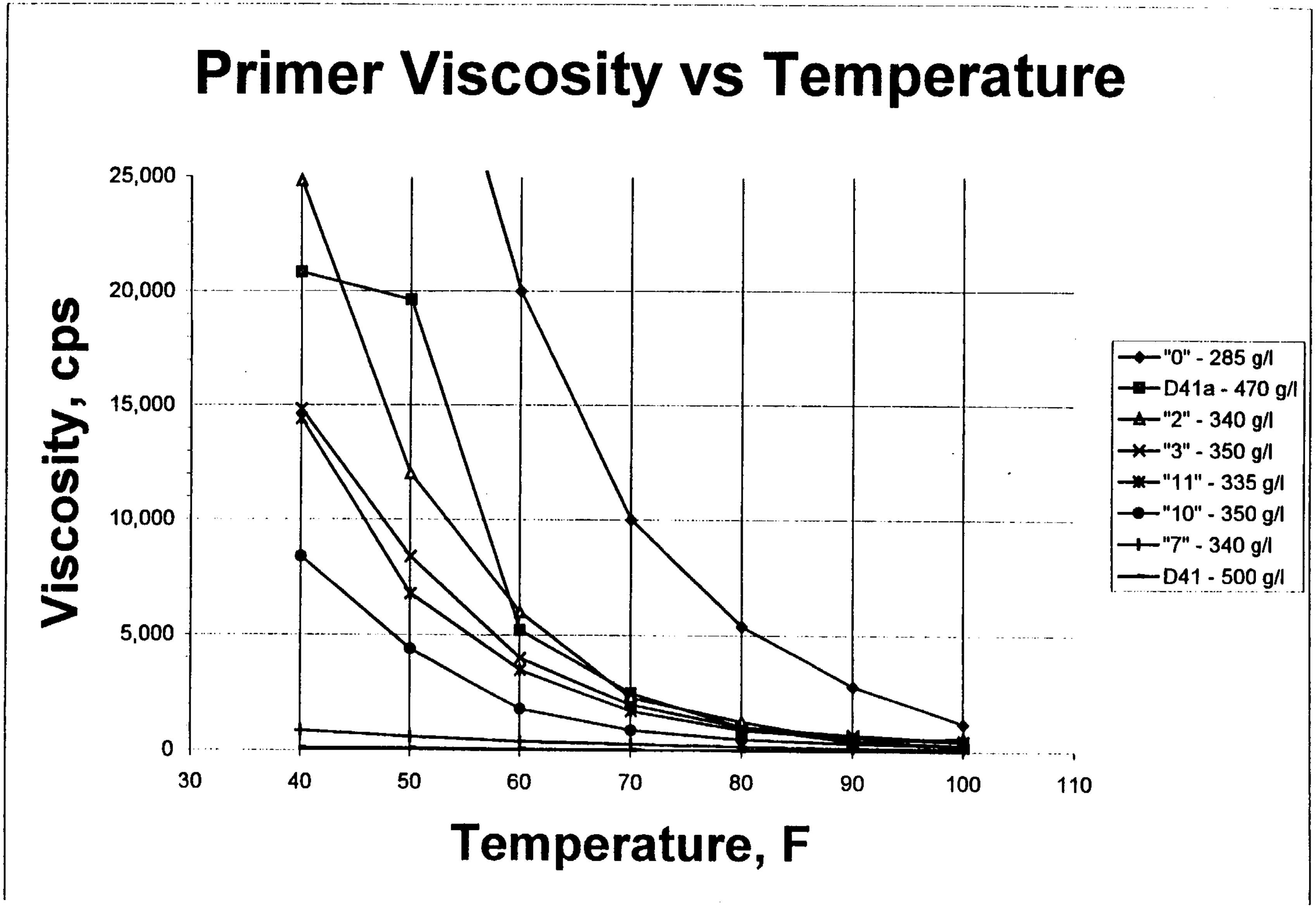
Primer Viscosity study at various temperatures - Brookfield RVF

Viscosity in CPS

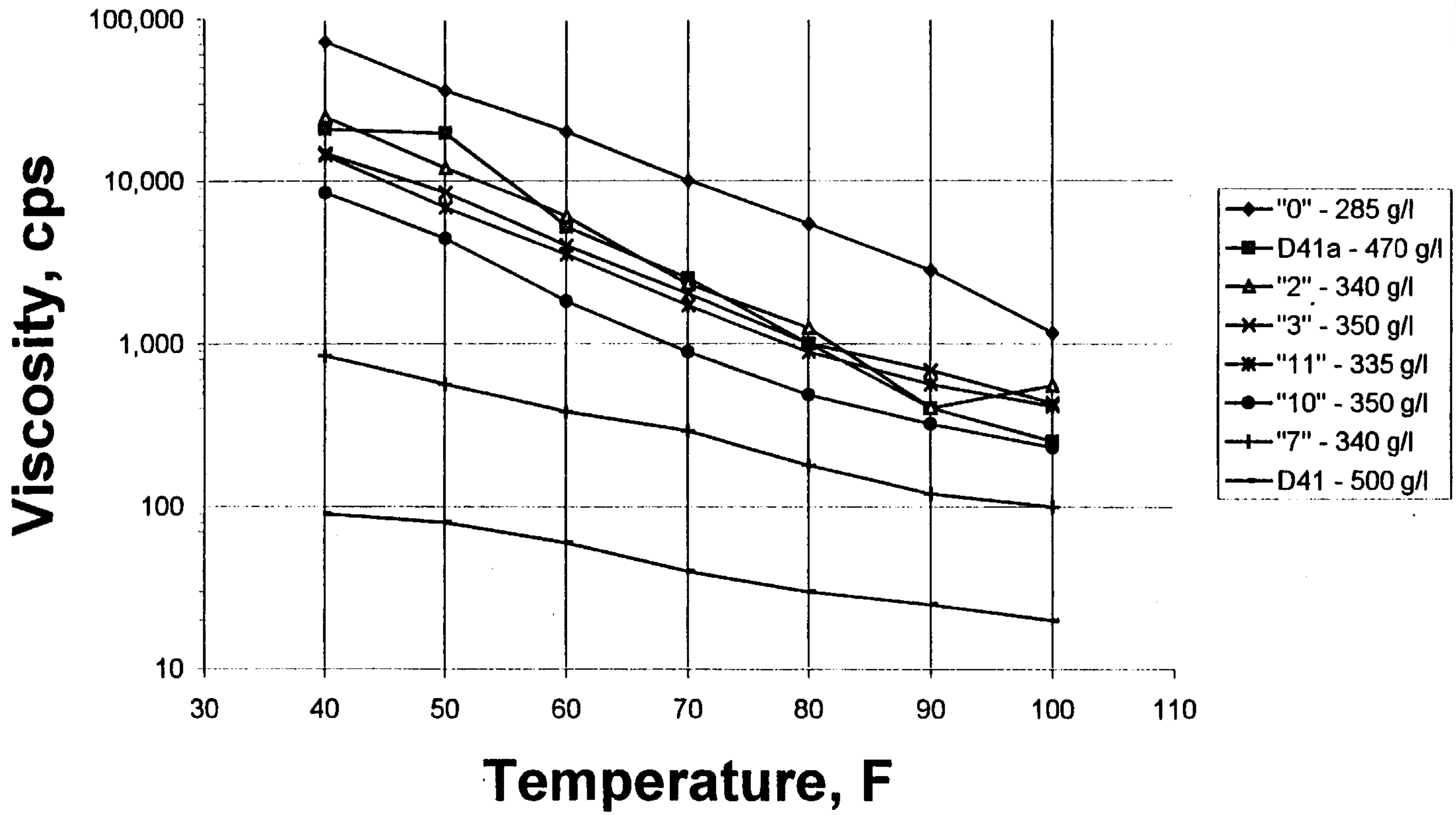
	"0" - 285 g/l	D41a - 470 g/	"2" - 340 g/l	"3" - 350 g/l	"11" - 335 g/l	"10" - 350 g/l	"7" - 340 g/l	D41 - 500 g/l
40	72,000	20,800	24,800	14,800	14,400	8,400	840	90
50	36,000	19,600	12,000	8,400	6,800	4,400	560	80
60	20,000	5,200	6,000	4,000	3,500	1,800	380	60
70	10,000	2,500	2,300	2,000	1,700	880	290	40
80	5,400	1,000	1,240	1,000	880	480	180	30
90	2,800	400	400	680	560	320	120	25
100	1,160	250	550	430	410	230	100	20

Primer descriptions

0	semi-hard asphalt cut in Rule 66 mineral spirits (sample presented to CARB on 18 January)
D41a	control ASTM D-41 primer with reduced solvent
2	SCAQMD compliant product
3	SCAQMD compliant product
11	SCAQMD compliant product -- slow dry
10	SCAQMD compliant product -- very slow dry (sample presented to CARB on 18 January)
7	SCAQMD compliant product -- slow dry
D41	control ASTM D-41 primer (sample presented to CARB on 18 January)


Primer Viscosity vs Temperature

Primer Viscosity vs Temperature



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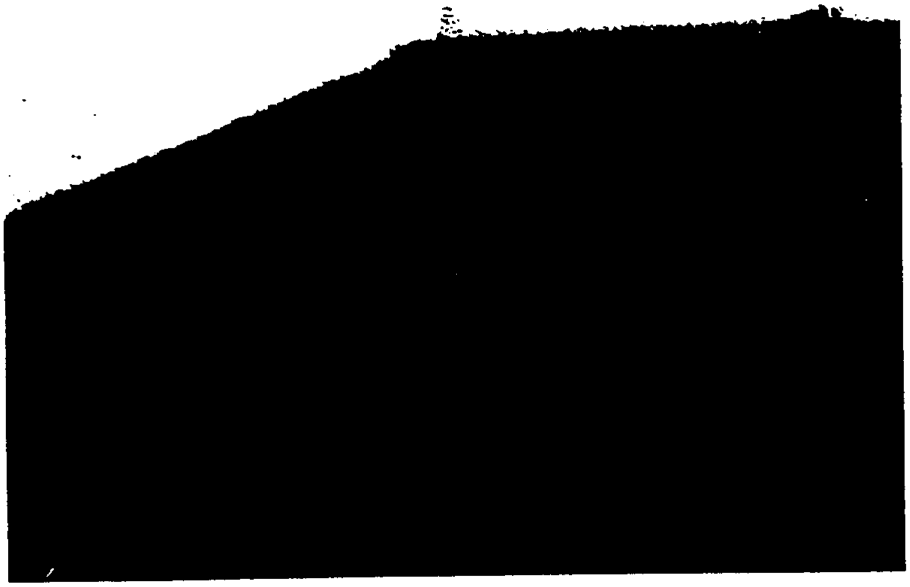
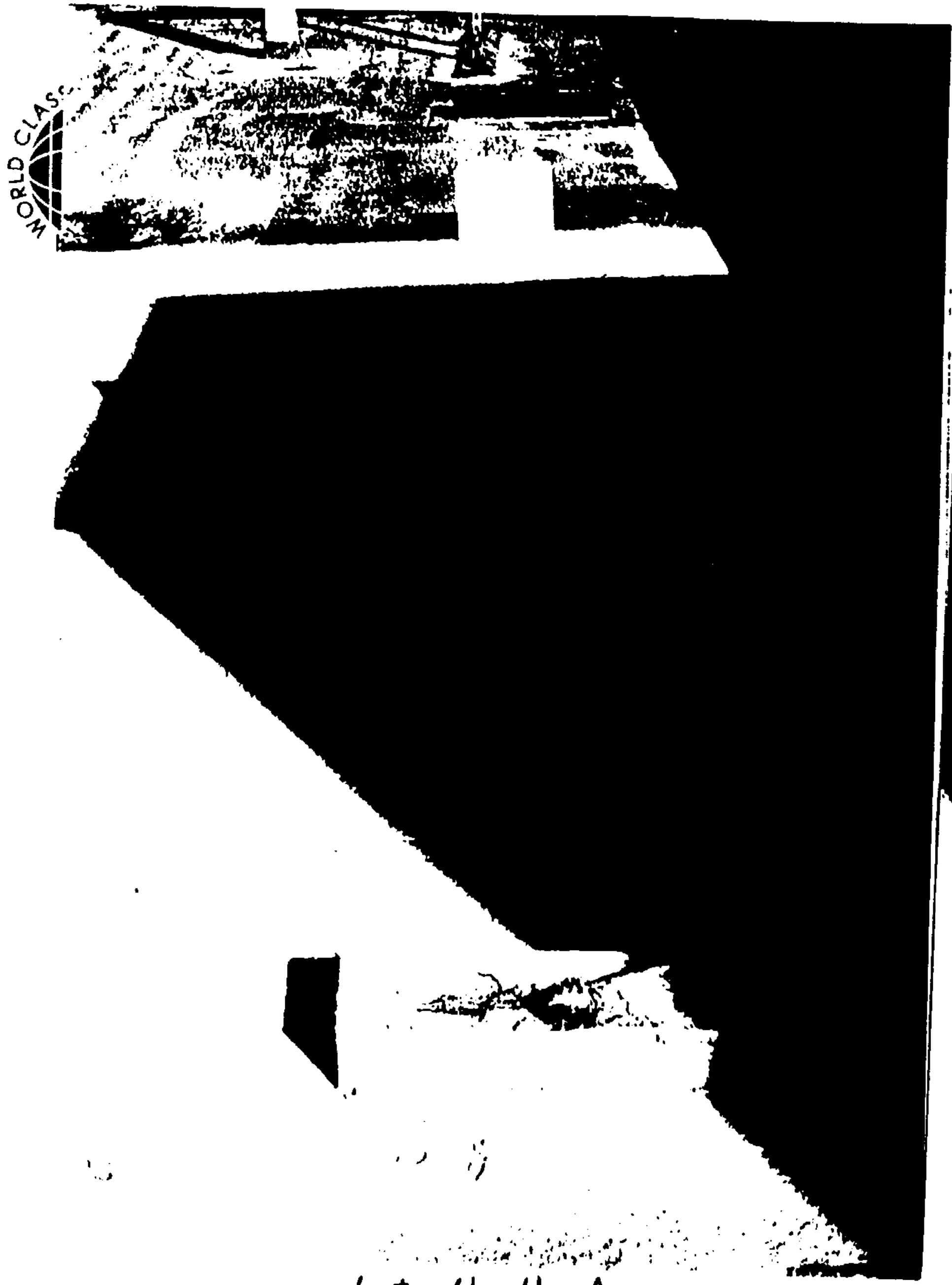
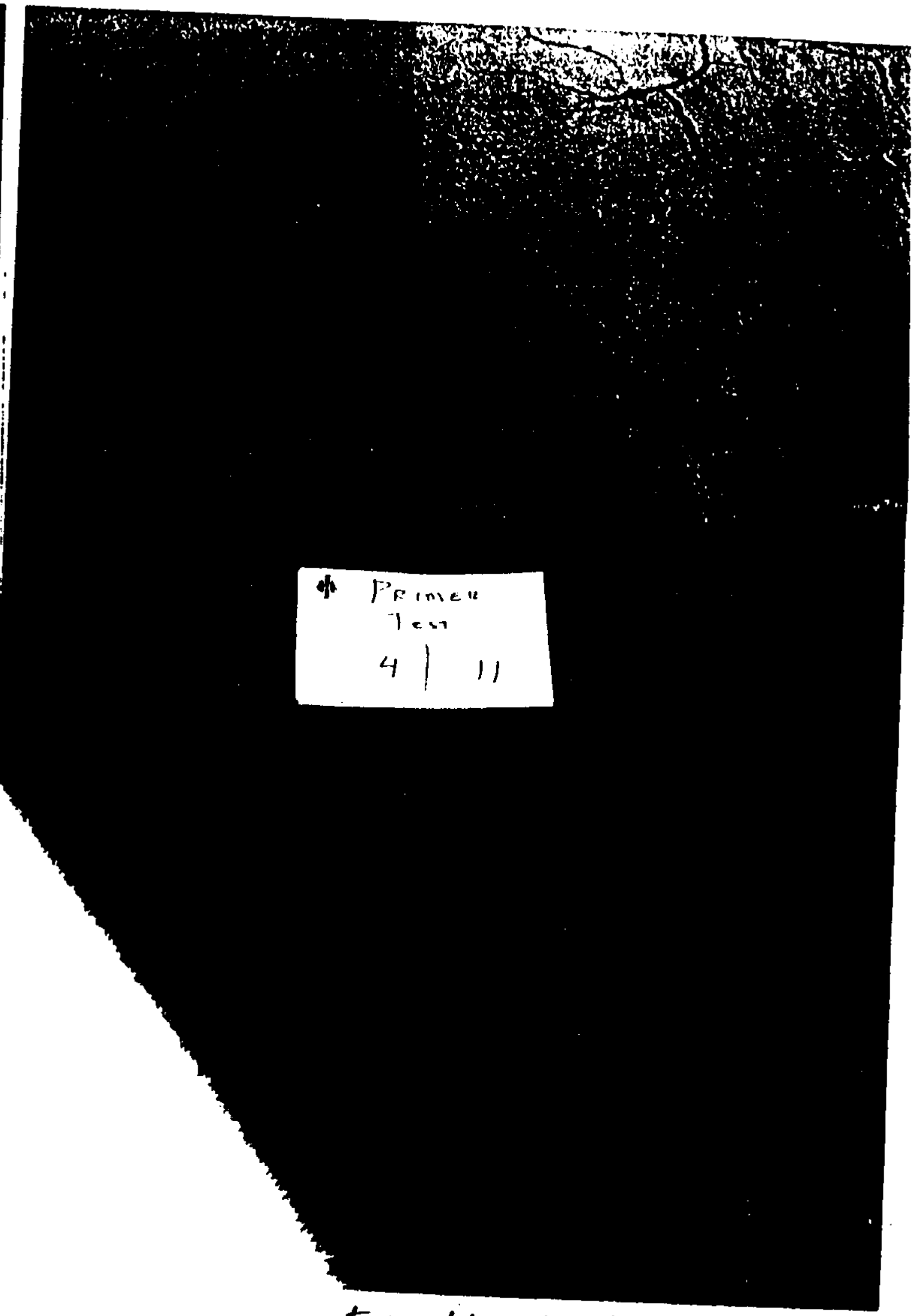


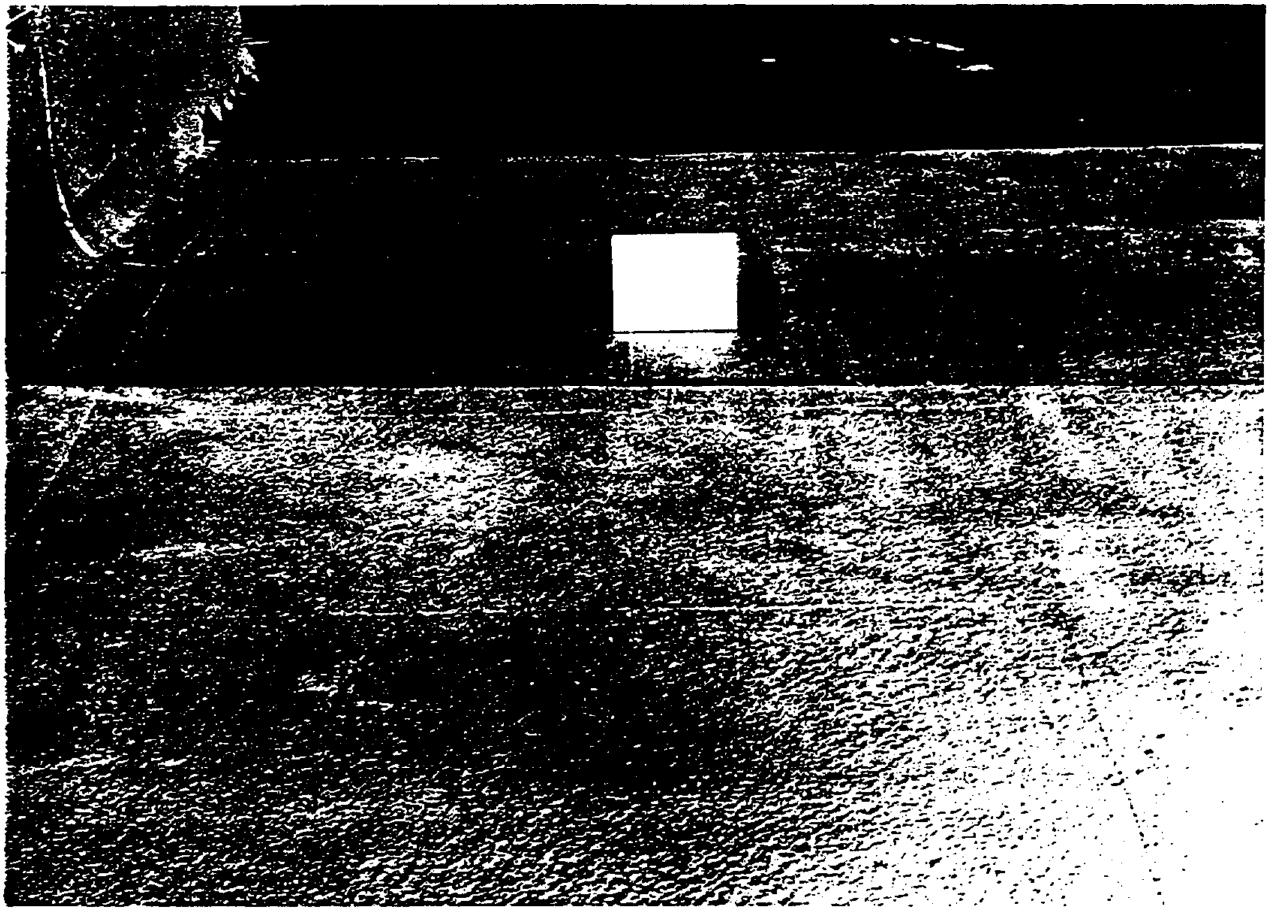
Primer test



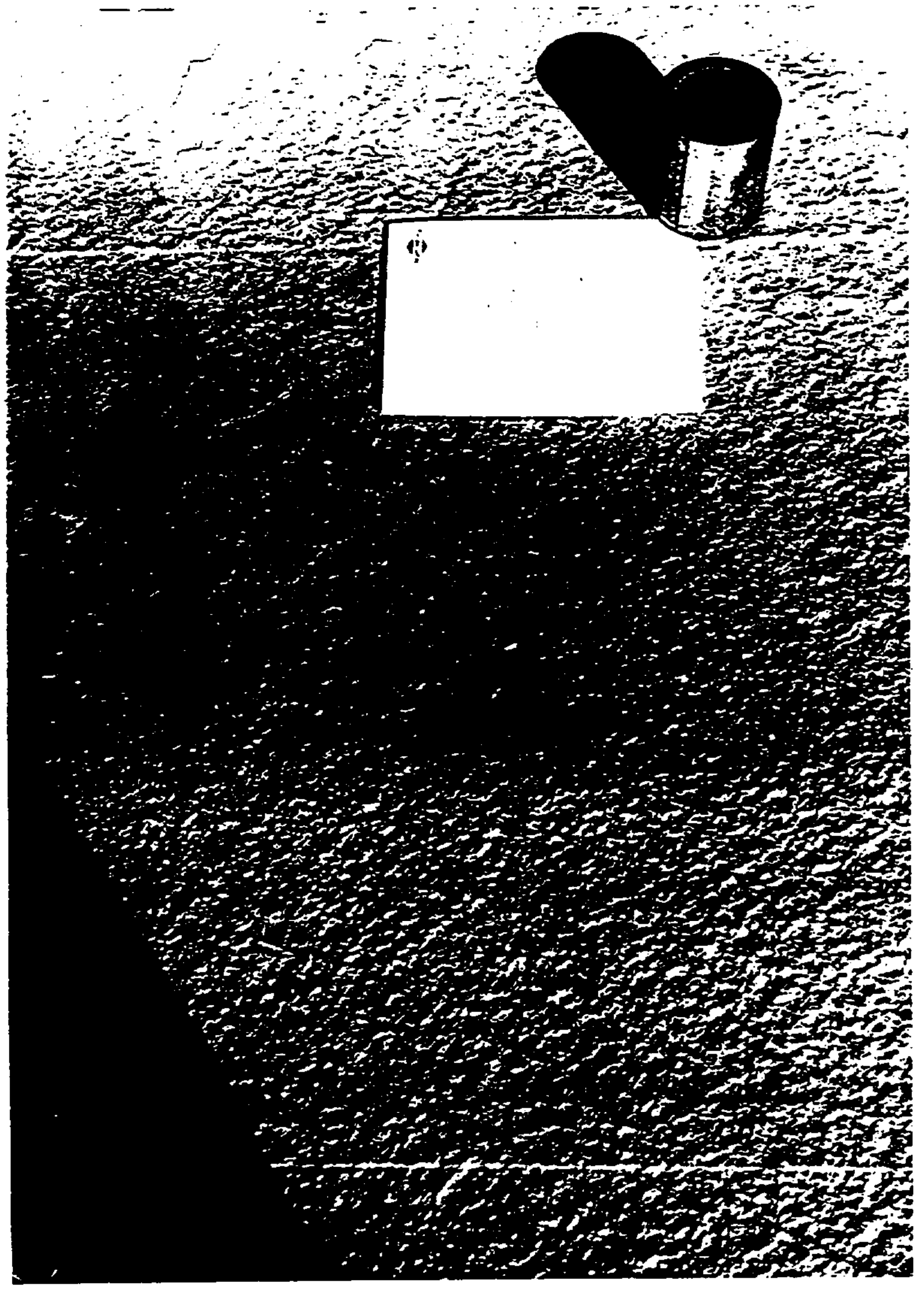
prim tst 4-11 far



prim tst 4-11 closeup



prim test 3.5 far



printst 3x5 closeup

Henry
COMPANY

13 March 2000

Mr. Jim Nyarady
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Sent via e-mail to jnyarady@arb.ca.gov. with hardcopy via mail

Re: Proposed SCM VOC limit for asphaltic roof coatings

Dear Mr. Nyarady:

8b-1 As we discussed in our meeting with the CARB staff on 18 January, solvent-based bituminous roof coatings provide a vital part of roof maintenance which can not be replaced by water-borne coatings. The VOC limit for such coatings in the proposed SCM is not adequate to permit a coating which can be applied at the low temperatures commonly found throughout the state. Because of weather limitations, water-borne (emulsion) roof coatings are not a substitute for solvent-borne coatings in many parts of the state for much of the year.

Purpose of Bituminous Roof Coatings

Bituminous roof coatings as a class provide a sacrificial coating which protects the waterproofing roof membrane from exposure to sunlight and air, thus significantly prolonging the life of the roof.

8b-2 Bituminous roof coatings are typically used as maintenance coatings rather than as part of a new roof system. In this role, solvent-borne and water-borne bituminous roof coatings function in different ways and accordingly are used differently.

Solvent-Borne Coatings

Solvent-borne coatings are chemically similar to the existing roof membrane. They penetrate a weathered bituminous roof membrane, sealing minor weathering damage and essentially solvent-weld themselves to the membrane. This leaves a new, durable top surface which is an integral part of the roof membrane.

Because they are solvent-based, these coatings are water resistant out of the can, and can be applied just before a rainfall if necessary.

2911 Slauson Avenue • Huntington Park, CA 90255
(323) 583-5000 • FAX (323) 582-6429 • www.henry.com

Solvent-borne coatings can be applied at almost any temperature. Since they are not water sensitive, they can be applied in cold weather and trusted to finish their cure without concern for the weather. For these reasons, solvent-borne coatings are often used to effect emergency repairs of weathered roofs.

Solvent-borne bituminous roof coatings are typically applied at 1.5 – 3 gallons per 100 square feet. We believe that most solvent-borne bituminous roof coatings are sold in 5 gallon pails to small contractors and Do-It-Yourselfers.

Water-borne (Emulsion) Coatings

8b-2

Water-borne asphaltic coatings can mechanically penetrate fine cracks, but do not affect the underlying membrane. They are held in place passively as an independent weather barrier. Emulsions, while durable in their own right, are also used as base coats for reflective coatings.

Because they are water dispersions, emulsions **must** be allowed to cure completely before being exposed to precipitation. Low temperatures and evening dew can prolong the cure of the coating substantially. For this reason they are typically applied only where warm, clear weather is predicted. Our recommended weather envelope is 50 °F and rising, with no dew, precipitation, or temperatures below 40 °F for 48 hours. These requirements leave much of California outside the safe application window for much of the year.

Emulsion roof coatings are typically applied at 3 – 5 gallons per 100 square feet. In our experience, because of the limitations on its use, much of the emulsion sold in California is sold in drums or totes to specialized contractors for use during warm weather.

Viscosity vs Temperature Data

Reducing the VOC content of a solvent-borne bituminous coating rapidly increases the viscosity, especially at cold temperatures.

Attached is an Excel spreadsheet ["CARB_coatings.xls"] which shows the viscosities of two different solvent-based asphalt roof coatings as a function of the VOC. The samples were generated by making a heavy production batch of each formula and then adding increments of solvent to the baseline material.

It is our experience that a roof coating can not be applied by brush (the usual method for solvent-borne coatings) if the viscosity is above ~80,000 centipoise. As you can see, only the two 350 g/l formulas provide this viscosities at 40 °F.

Failures of Water-borne Roof Coatings

Last January you asked whether we could document weather-related performance problems of water-borne roof coatings.

Attached are photographs of three different jobs which experienced weather-related failures last year. In all cases, the coatings were applied well outside of our recommended weather "envelope"; in all cases the contractor was trying to make some schedule commitment and gambled with the coating.

8b-2 The first photo ["frozen_emulsion"] is a close up of a coating applied last fall in northern California. The emulsion froze the first night when the weather dropped below 30 °F. The cracks in the coating go down to the membrane, and are already filling with dirt and water. This roof will have to be thoroughly cleaned and recoated next summer, when the weather permits.

The emulsion in second two photos ["K'ton AC unit" and "K'ton field area"] was applied to a cold (~40 °F) roof deck with the air temperature between 45 – 50 °F. That night, the temperature dropped below 40 °F and ~1/4" of rain fell. The photos, taken the next day, show that the emulsion washed off completely, exposing the polyester fabric below.

The third set of photos shows another roof in southern California ["Redlands_north" and "Redlands_east"]. During the week that the coating was applied, while the days were warm – typically above 65 °F – the roof froze at night. Light rain arrived the day after the coating shown was applied. This softened the coating in the low areas where the roof ponds, so that when a heavier rain arrived a few days later the emulsion washed out of the ponded areas, but not off the main area of the roof.

In all three cases, a solvent-borne coating would have survived the weather and remained on the roof, eventually curing into a permanent protective layer.

If you have any questions, please call me at (323) 908-5279. Note that this is a new direct-dial phone number.

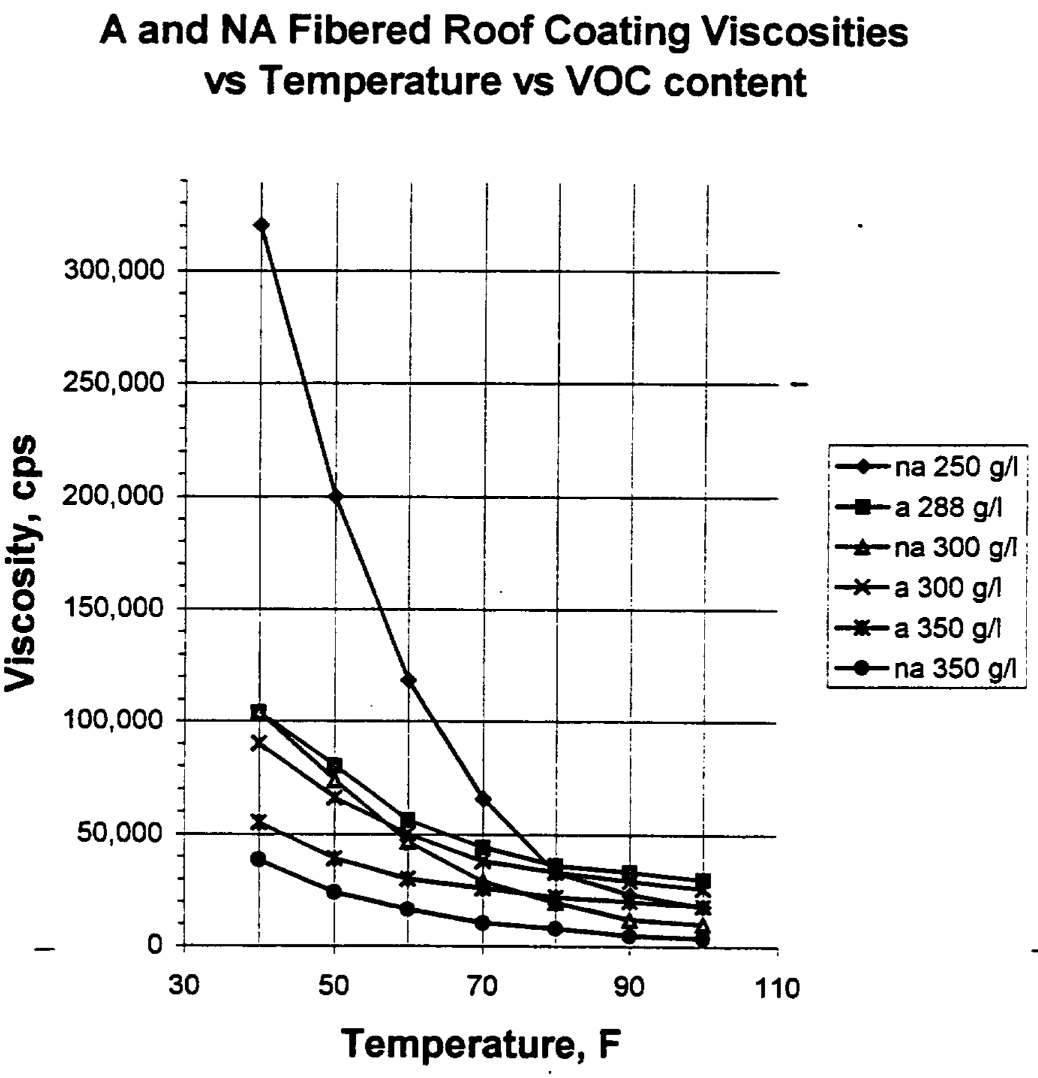
Paul A Beemer

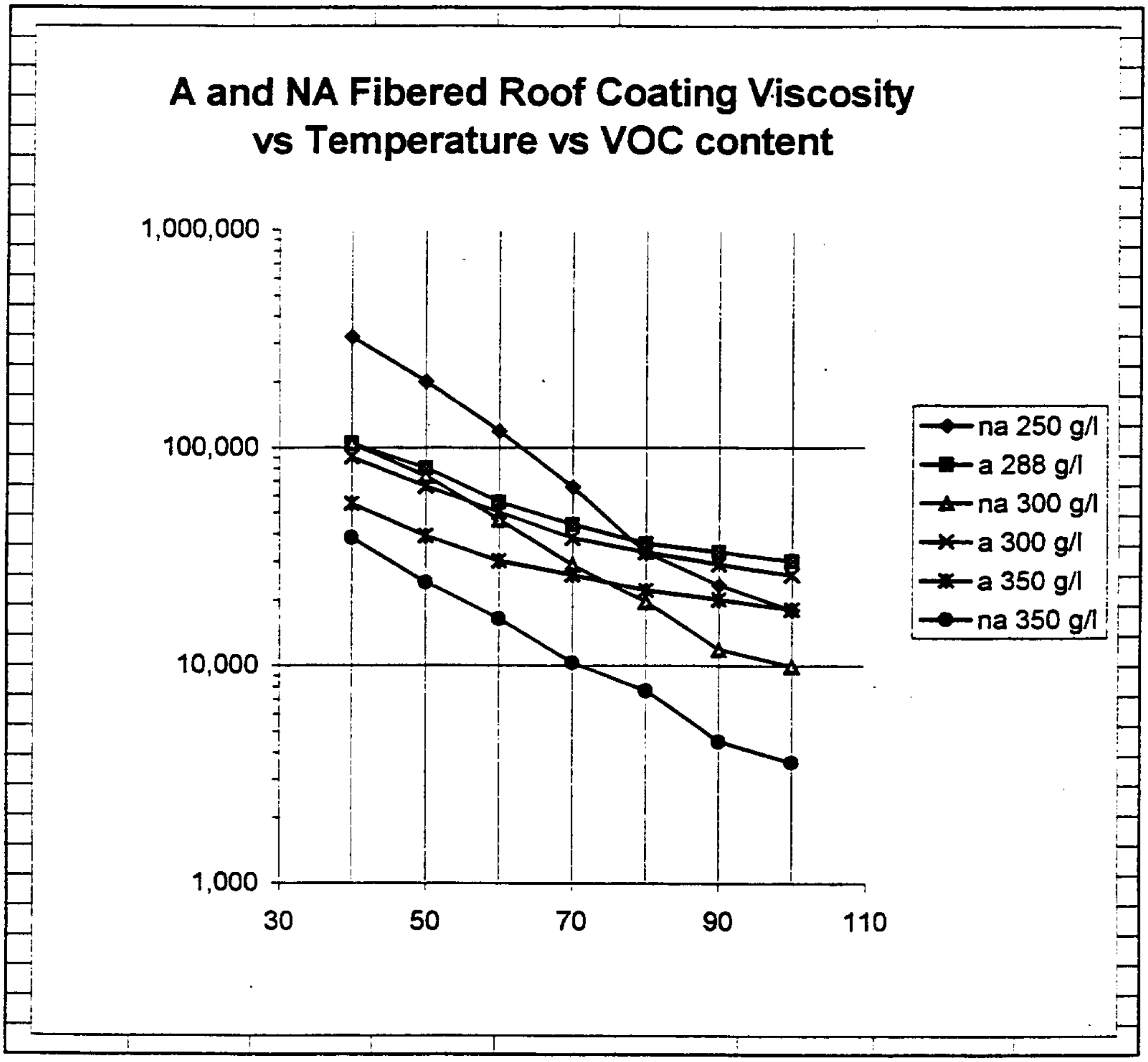
Paul A. Beemer
Technical Director, Coatings Division
Henry Company

a and na Roof Coating Viscosity study at various temperatures - Brookfield HBT

Master batch of each formula thinned in 2 steps to provide separate samples at 300 and 350 g/l

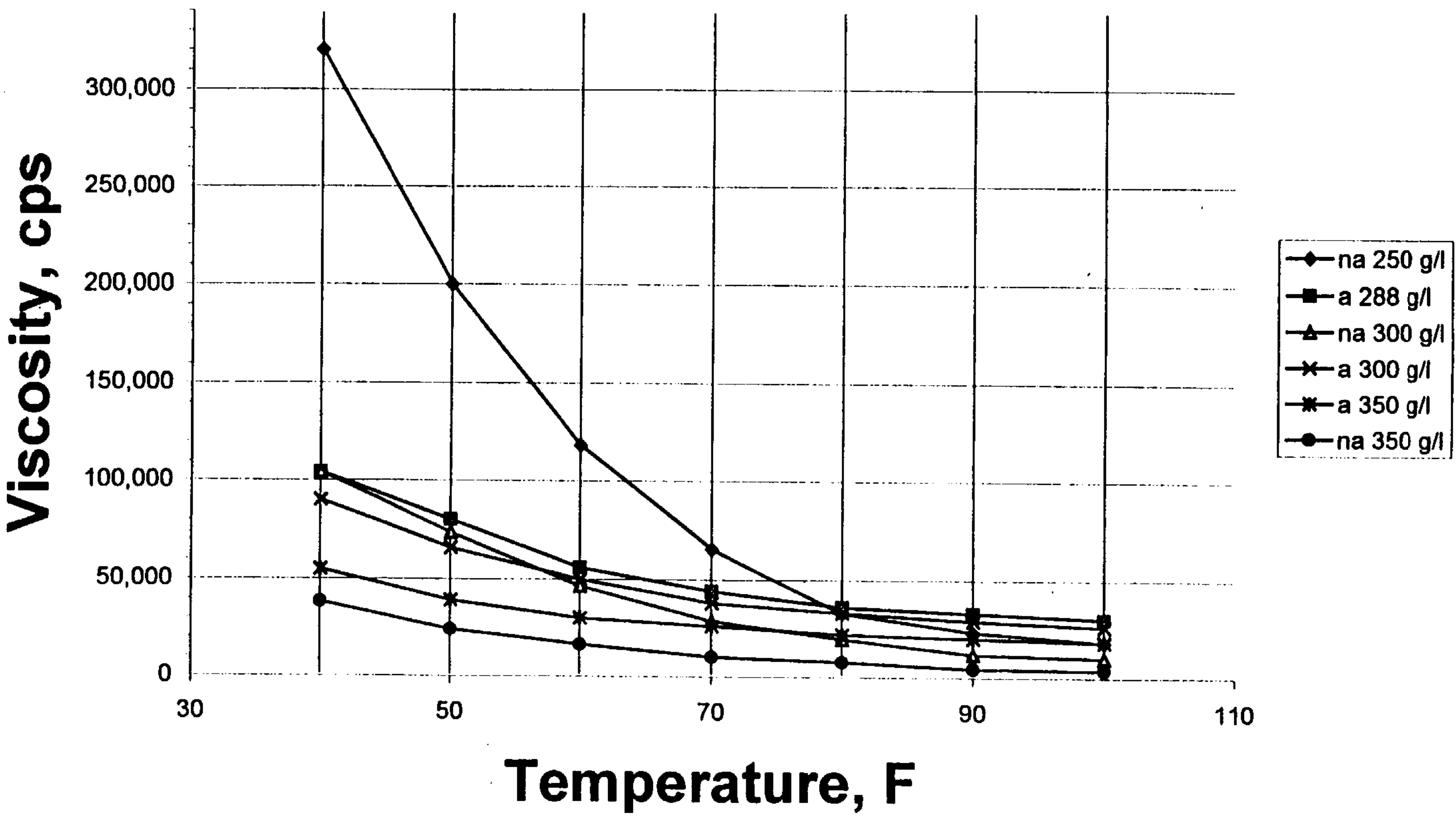
		Viscosity in CPS				
	na 250 g/l	**a 288 g/l**	**na 300 g/l**	**a 300 g/l**	**a 350 g/l**	**na 350 g/l**
40	320,000	104000	104,000	90000	55000	38,400
50	200,000	80000	73,600	66000	39000	24,000
60	118,400	56000	46,400	50000	30000	16,320
70	65,600	44000	28,800	38000	26000	10,240
80	32,800	36000	19,520	33000	22000	7,680
90	23,200	33000	11,840	29000	20000	4,480
100	17,920	30000	9,920	26000	18000	3,600


A and NA Fibered Roof Coating Viscosities vs Temperature vs VOC content
Viscosity, cps
300,000
250,000
200,000
150,000
100,000
50,000
0
30
50
70
90
110
Temperature, F
na 250 g/l
a 288 g/l
na 300 g/l
a 300 g/l
a 350 g/l
na 350 g/l

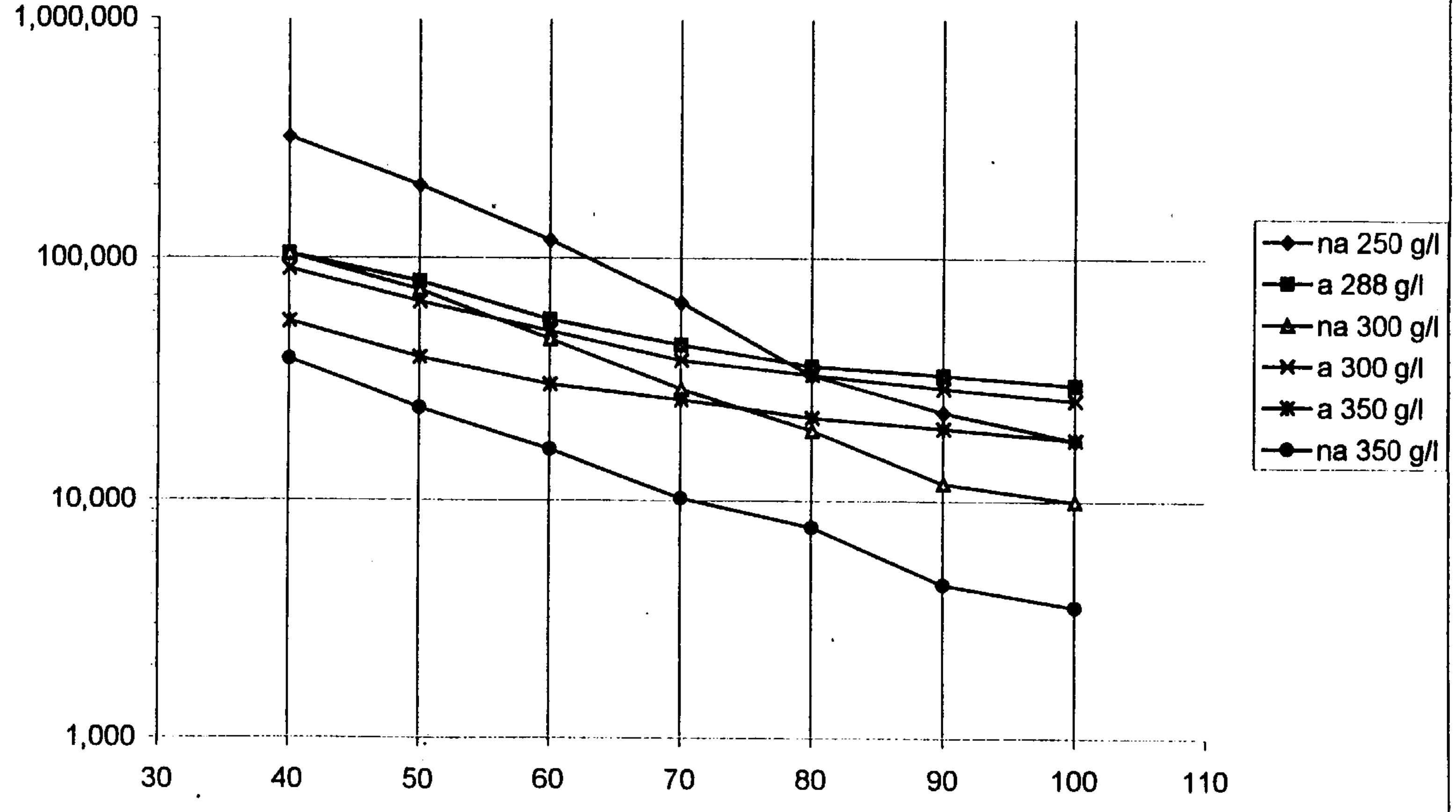


A and NA Fibered Roof Coating Viscosity vs Temperature vs VOC content

A and NA Fibered Roof Coating Viscosities
vs Temperature vs VOC content

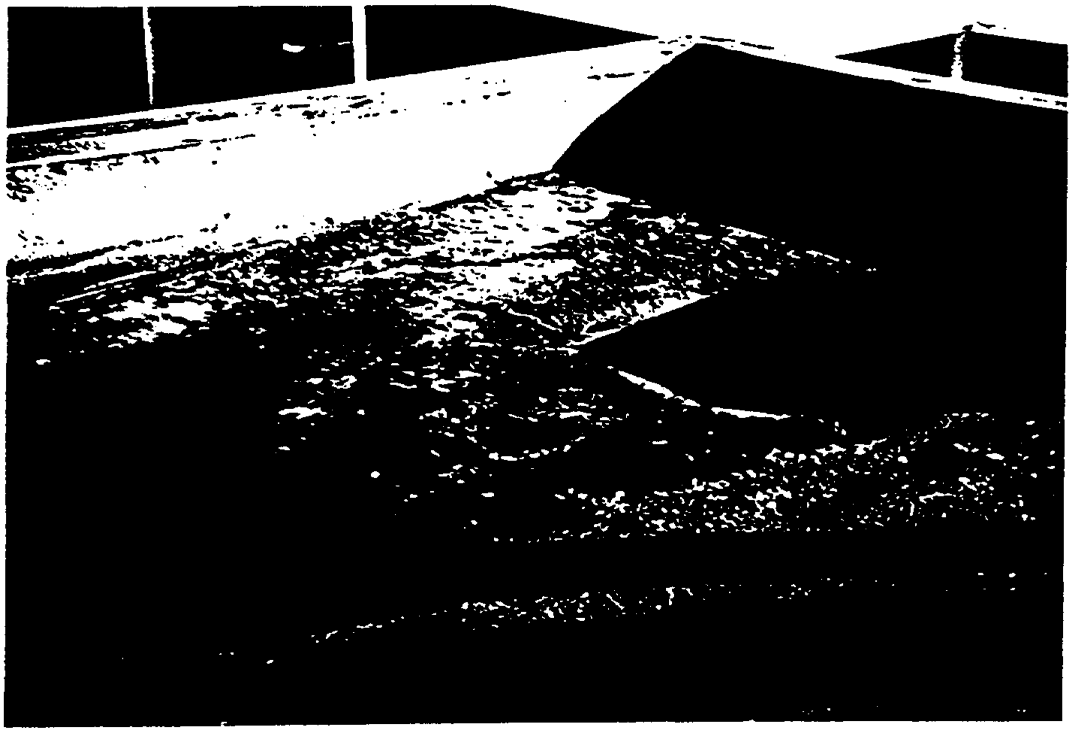


A and NA Fibered Roof Coating Viscosity vs Temperature vs VOC content

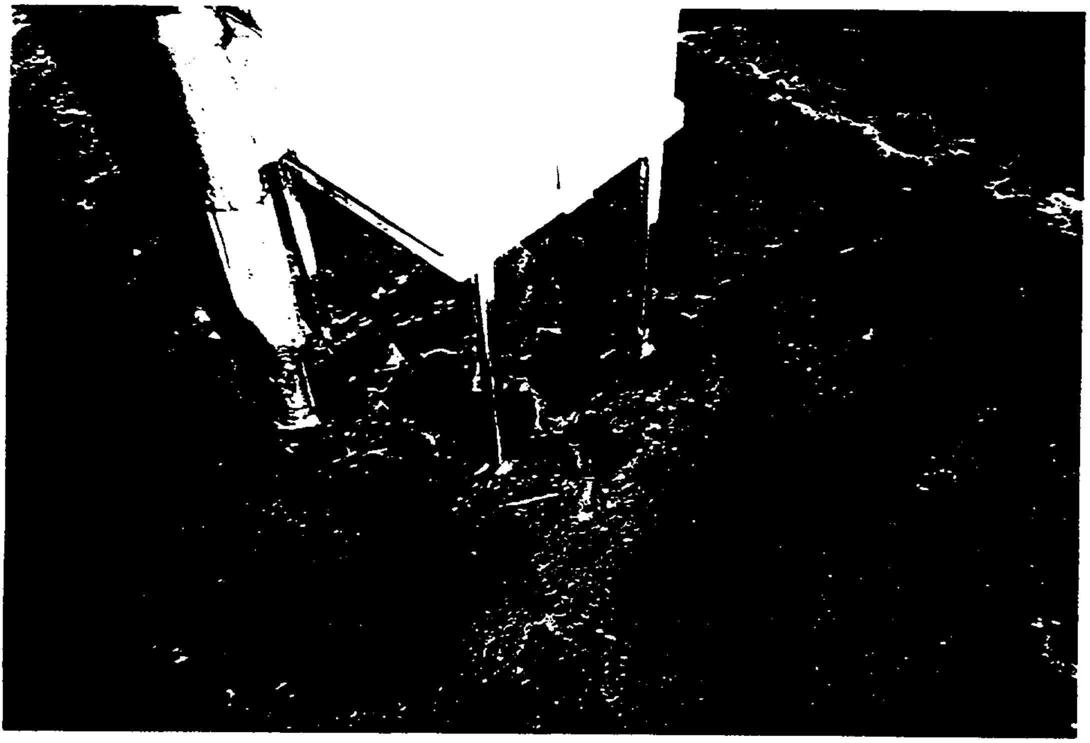


frozen emulsion

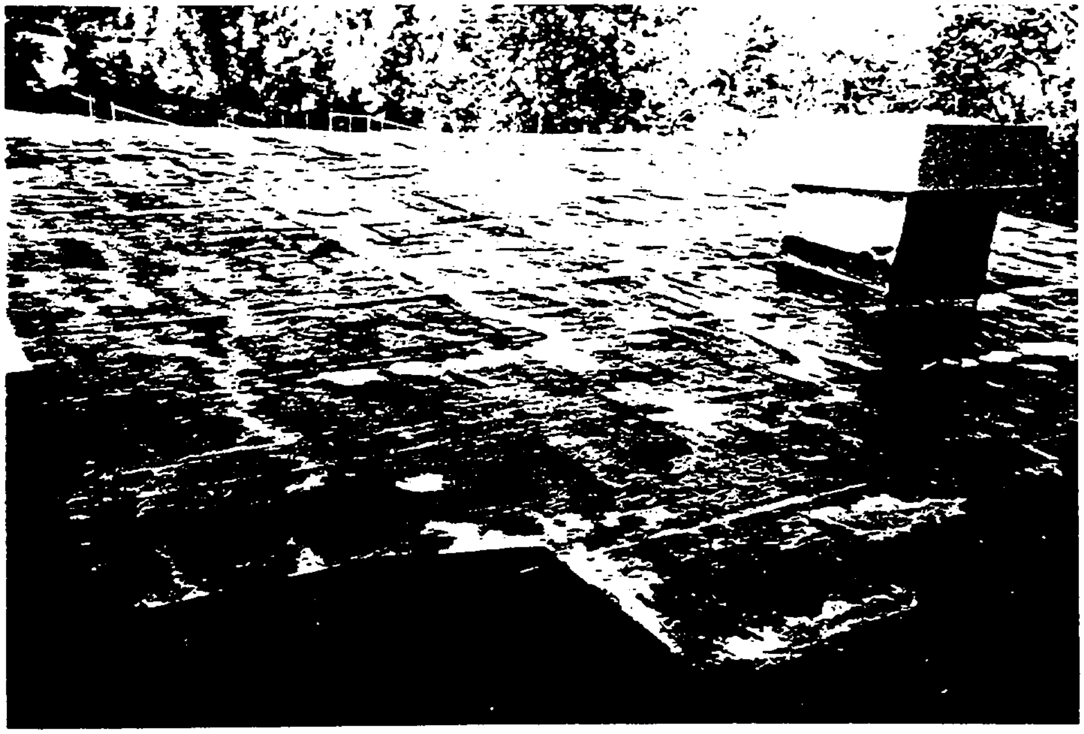
Redlands north



Redlands east



K'ton AC unit



K'ton field

SHERWIN WILLIAMS

The Sherwin-Williams Company
EH&RS Department 4 Midland
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115-1075

BY FEDERAL EXPRESS NO. 8187-1626-1514

March 24, 2000

Ms. Barbara Fry
Manager, Measures Development Section
Stationary Source Division
Air Quality Measures Branch
California Air Resources Board
2020 L. Street
Sacramento, CA 95812

RE: Proposed Suggested Control Measure to Limit the Volatile Organic Compound Content of Architectural and Industrial Maintenance Coatings

Dear Ms. Fry,

9a-1 During the March 16, 2000 Workshop to discuss the proposed suggested control measure to limit the volatile organic compound content of architectural and industrial maintenance coatings, I mentioned that there were a number of errors in Appendix E of the Draft Program Environmental Impact Report. The attached Table provides the Corrections needed for the Sherwin-Williams products. Also enclosed are the appropriate Product Data Sheets. Where the Product Data Sheet is in error, I have also enclosed the Material Safety Data Sheet.

In addition to the VOC content errors found in Appendix E, there were also a number of products inappropriately included:

9a-2
1. Table E-8 Floor Coatings from 100 to 50 g/l
   Benjamin Moore's Safety and Zone Marking Latex Paint is listed as a Floor coating (see the attached product description Attachment 1 from their website). It is obviously a traffic coating to be applied to streets, highways, parking lots, etc.

9a-3
2. Table E-2 Lacquers from 550 to 680 g/l
   SHER-W00D® CAB-Acrylic Lacquer is for Industrial Use Only and is NOT for field application. Attachment 2 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com). A representative label is attached.

   SHER-W00D ® White CAB-Acrylic Lacquer is for Industrial Use Only and is NOT for field application. Attachment 3 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com)

9a-4
3. Table E-3 Lacquers < 550 g/l
   SHER-WOOD® KEM AQUA® Lacquer is for Industrial Use Only and is NOT for field application. Attachment 4 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com). A representative label is attached.

9a-4 Sherwin-Williams Polane® S Plus Polyurethane (which is probably meant to be Sherwin-Williams Polane® HS Plus Polyurethane since we do not have an "S" version) is for Industrial Use Only and is NOT for field application. Attachment 5 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com). A representative label is attached.

Because of these significant errors, Appendix D, Description and Technical Assessment of Coating Categories may need to be amended. A few examples of discussions that may now be in error are shown below:

9a-5 Page D-6 lists properties used in marketing exterior flat coatings which comply with the proposed 100 g/l. The claim is made for "low temperature application to 35° F." That claim is the primary claim made for the Sherwin-Williams Low Temp 35 Latex Exterior Flat coating line. However, the VOC content of 59 g/l reported by CARB in *Table E-6: Flats < 100 g/l* is in error; the correct VOC content for this coating line ranges from 101 to 135 g/l. Unless other products on this table also make this claim, the list on page D-6 and the associated discussion will need to be amended.

Page D-16 lists properties used in marketing interior low and medium gloss coatings which comply with the proposed 150 g/l. The claim is made for "alkyd-like flow and leveling." That is one of the key characteristics made for the Sherwin-Williams ProClassic® Waterborne Acrylic Semi-Gloss. However, the VOC content of 70 g/l reported by CARB in *Table E-14: Nonflats 150 – 50 g/l* is in error; the correct VOC content for this coating line is 157 g/l. Unless other products on this table also make this claim, the list on page D-6 and the associated discussion will need to be amended.

I hope this information is helpful and that these errors will be corrected in the Environmental Impact Report.

Additional comments on the Draft Program Environmental Impact Report will be forthcoming.

I am sorry that I was unable to send this to you sooner. My first day back in my office since the Workshop was on March 23, 2000.

Sincerely,

Madelyn K Harding

Madelyn K. Harding, Administrator
Product Compliance & Registrations

CORRECTIONS NEEDED FOR SHERWIN-WILLIAMS PRODUCTS TO APPENDIX E TABLES

	Table	Table Title	Product	VOC (g/l) in Table	Correct VOC (g/l) Regulatory and
9a-6	E-6	Flats < 100 g/l	S-W EverClean® Latex Int. Flat	74	152-215
			S-W Low Temp 35™ Latex Ext. Flat	59	101-135
9a-7	E-11	Industrial Maintenace Ctgs. From 250 to 100 g/l	S-W Tank-Clad™ HS Epoxy (B62-80 series)	177	
				(catalyzed &	reduced 10%) = 249
9a-6	E-14	Nonflats from 150 to 50 g/l	S-W ProClassic® Waterborne Acrylic Semi-Gloss	70	157
			S-W ProClassic® Waterborne Acrylic Gloss	75	157
			S-W ProMar® 200 Interior Latex Gloss Enamel	90	155-195
			S-W SuperPaint® Ext. High Gloss Latex (A85)	57	105-130
			S-W EverClean® Int. Satin (A97)	81	186-220
9a-6	E-15	Nonflats 50 g/l or less	S-W LowTemp 35™ Ext Satin House Paint	40	101
			S-W A-100® Line - Satin (A82)	38	90-115
			S-W A-100® Line - Gloss (A8)	49	133-157
9a-6	E-17	Quick Dry Enamels - from 250 to 0 g/l	S-W ProClassic® Waterborne Acrylic Gloss	75	157
			S-W ProMar® 200 Latex Gloss Enamel	90	155-195
			also, does not meet 70 minimum at 60 degrees		
9a-8	E-20	Primer, Sealer, Undercoater - 100 g/l and less	S-W Loxon® Ext. Acrylic Masonry Primer	60	130
			S-W PrepRite™ 400	19	60
			S-W PrepRite™ 200	26	85
9a-9	E-25	Waterproofing Sealers - 250 g/l and less	S-W Cuprinol® Clear Deck Sealer	27	287

www.sherwin-williams.com

EVERCLEAN®
INTERIOR LATEX FLAT
A96 SERIES

CHARACTERISTICS

EverClean® Interior Latex Flat is a specially formulated paint providing the washability and durability usually found in glossy enamel finishes. It allows most household stains to be removed without the need for scrubbing.

Color: Most ColorAnswers® colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.7 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 0-4 units @ 85°
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Extra White	0-4	special formulas
Pure White	0-4	special formulas
Midtone Base	4-8	100%
Luminous White	0-5	125%

Vehicle Type: Styrenated Acrylic
A96W24
VOC: 155 grams/liter; 1.29 lb/gal
Volume Solids: 42 ± 2%
Weight Solids: 61 ± 2%
Weight per Gallon: 12.3 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-29K
TT-P-1728A (cancelled)
TT-P-2119 Class I (cancelled)
A-A-2246 Type I & II, Class 1

SPECIFICATIONS

Aluminum
2 cts. EverClean Interior Latex Flat
Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. EverClean Interior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. EverClean Interior Latex Flat
Drywall
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Flat
Plaster
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Flat
Masonry
1 ct. PrepRite Masonry Primer
2 cts. EverClean Interior Latex Flat
Steel
1 ct. All Surface Enamel Primer
2 cts. EverClean Interior Latex Flat
Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Flat

Mildew Resistant
This product contains agents which inhibit the growth of mildew on the surface of this paint film

WASHABILITY TEST —ASTM D3450-90
"Coating will retain, on average, greater than 80.0% reflectance after standardized soilant has been washed with either an abrasive or nonabrasive cleanser for 100 cycles when tested in accordance with ASTM D3450-90"

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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EVERCLEAN®

INTERIOR LATEX FLAT
A96 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper or other abrading method. Bare steel must be primed the same day as cleaned.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with ProClean Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

APPLICATION

Apply at temperatures above 50°F.
No reduction needed.

Brush
Use a nylon/polyester brush.

Roller
Use a 3/8" - 1/2" nap Soft Woven roller cover only.

Spray—Airless
Pressure .... 2000 psi
Tip .... .015"-.019"
For touching-up, reduce the product by one pint per gallon.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. Flush spray equipment after cleaning with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

CAUTION contains CRYSTALLINE SILICA. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
7/99 LCE
11 00

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

102.05

LowTemp 35™
Exterior Latex Flat
B15 Series

CHARACTERISTICS

LowTemp 35 Exterior Latex Flat is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @4 mils wet; 1.5 mils dry
Drying Time @ 50% RH:
temperature and humidity dependent

	@ 35-45°F	**@ 45-60°F**
Touch:	2 hour	2 hours
Recoat:	24-48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.

Flash Point: 201°F, PMCC
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic
B15W210
VOC: 129 grams/liter; 1.08 lb/gal
Volume Solids: 40 ± 2%
Weight Solids: 57 ± 2%
Weight per Gallon: 11.7 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-E-2784A, Type III

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate	**Primer**
Aluminum[1]	no primer necessary
Block	Loxon Block Surfacer
Brick	Masonry Conditioner or ProMar Masonry Conditioner
Exterior Drywall	LowTemp 35 Exterior Latex Primer
Galvanized Steel[1]	no primer necessary
Masonry/Cement/Stucco	LowTemp 35 Exterior Latex Primer Loxon Ext. Acrylic Masonry Primer[2]
Plywood	LowTemp 35 Exterior Latex Primer
Preprimed Metal Siding[1]	DTM Bonding Primer[2]
Steel, alkyd primer[1]	All Surface Enamel Oil Primer
Steel, latex primer[1]	All Surface Enamel Latex Primer[2]
Vinyl Siding	no primer necessary
Wood, Composition Board	LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.

[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.

Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

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102.05

LOWTEMP 35™
EXTERIOR LATEX FLAT
B15 SERIES

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.

No reduction necessary.

Brush

Use a nylon/polyester brush.

Roller

Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS
B15W296

Pigment by Weight	37%
Titanium Dioxide	13%
Silicates	22%
Zinc Oxide	2%
Vehicle by Weight	63%
Acrylic Polymer	15%
Water	41%
Glycol/Esters	4%
Additives	3%
Total	100%

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.
Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.
On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS

CAUTION contains ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

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PROCLASSIC® WATERBORNE
INTERIOR ACRYLIC SEMI-GLOSS ENAMEL
B31 SERIES

CHARACTERISTICS

ProClassic® Waterborne Interior Acrylic Semi-Gloss Enamel provides a durable, non-yellowing, finish equal to an alkyd enamel. The superior flow and leveling characteristics result in a smooth, rich finish.

Project Uses
- all trim areas: moulding
- cabinets/doors/windows
- kitchen's/baths/locker rooms
- laundry rooms
- high traffic areas

Substrates
- drywall/plaster
- paneling/wood
- metal
- concrete/masonry
- wallcovering

Color: Most ColorAnswers® colors

Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry

Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours

Finish: 35-45 units @ 60°

Flash Point: 201°F, PMCC

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Extra White	0-4	100%
Pure White	0-4	100%
Midtone Base	4-8	100%
Deeptone Base	8-12	100%
Luminous Base	0-4	100%

Vehicle Type: Styrene Acrylic

B31W21
VOC: 157 grams/liter; 1.31 lb/gal
Volume Solids: 35 ± 2%
Weight Solids: 49 ± 2%
Weight per gallon: 10.5 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification: AA-2246, Class 3

SPECIFICATIONS

Aluminum
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Block
1 ct. PrepRite Block Filler
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Drywall
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Plaster
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Masonry
1 ct. PrepRite Masonry Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Steel
1 ct. All Surface Enamel Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean™ Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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PROCLASSIC® WATERBORNE

INTERIOR ACRYLIC SEMI-GLOSS ENAMEL
B31 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, wire brush, or other abrading method. Remove all sanding dust. Bare steel must be primed the same day as cleaned. Although this product has some rust resistance, a separate rust inhibiting primer is recommended on bare steel.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew
Remove before painting by washing with ProClean Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

LABEL ANALYSIS
B31W21

Pigment by Weight	26%
Titanium Dioxide	21%
Calcium Carbonate	5%
Vehicle by Weight	74%
Styrene Acrylic Resin	17%
Water	47%
Aliphatic Solvent	1%
Additives	9%
Total	100%

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.

Brush
Use a nylon/polyester brush.

Roller
Use a 1/4"-3/4" nap synthetic roller cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.021"
Tip for fine finishing	.011"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean™ All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

CAUTION contains CRYSTALLINE SILICA. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
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PROCLASSIC® WATERBORNE
INTERIOR ACRYLIC GLOSS ENAMEL
B21 SERIES

CHARACTERISTICS

ProClassic® Waterborne Interior Acrylic Gloss Enamel is a high quality water based enamel designed to provide service performance equal to high quality alkyd enamels.

Project Uses
- all trim areas and moulding
- cabinets/doors/windows
- kitchen's/baths/locker rooms
- laundry rooms
- high traffic areas

Substrates
- wood & metal
- drywall/plaster
- stucco
- concrete/masonry
- wallcovering

Color: Most ColorAnswers® Colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Finish: 70 units @ 60°
Flash Point: 201°F, PMCC
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Extra White	0-4	100%
Pure White	0-4	100%
Luminous White	0-4	100%

Vehicle Type: Acrylic
B21W21
VOC: 157 grams/liter; 1.31 lb/gal
Volume Solids: 38 ± 2%
Weight Solids: 49 ± 2%
Weight per Gallon: 9.9 lb

SPECIFICATIONS

Aluminum
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Block
1 ct. PrepRite Block Filler
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Drywall
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Plaster
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Masonry
1 ct. PrepRite Masonry Primer
2 cts. Interior Waterborne Semi-Gloss Enamel

Steel
1 ct. All Surface Enamel Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean™ Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean™ Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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SHERWIN WILLIAMS

PROCLASSIC® WATERBORNE
INTERIOR ACRYLIC GLOSS ENAMEL
B21 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, wire brush, or other abrading method. Remove all sanding dust. Bare steel must be primed the same day as cleaned. Although this product has some rust resistance, a separate rust inhibiting primer is recommended on bare steel.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew
Remove before painting by washing with ProClean™ Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select™ Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.

Brush
Use a nylon/polyester brush.

Roller
Use a quality 1/4" - 3/4" nap cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.021"
Tip for fine finishing	.011"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean™ All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
7/99 LCE
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LABEL ANALYSIS
B21W21

Pigment by Weight	24%
Titanium Dioxide	24%
Vehicle by Weight	76%
Styrene Acrylic Resin	21%
Water	45%
Aliphatic Solvent	2%
Glycol	3%
Additives	5%
Total	100%

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PROMAR® 200

INTERIOR LATEX GLOSS ENAMEL

B21 SERIES

CHARACTERISTICS

ProMar 200 Interior Latex Gloss Enamel is our finest quality product designed for the professional. This product is recommended for interior application on walls, ceilings, and trim of primed plaster, wallboard, wood, masonry, and primed metal.

Color: Most ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.5 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 60-80 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Pure White	0-4	100%
Midtone Base	4-8	100%
Deeptone Base	8-12	100%
Luminous White	0-5	125%

Vehicle Type: Vinyl Acrylic
VOC (as packaged):
189 grams/liter; 1.5 lbs/gal
Volume Solids: 38 ± 2%
Weight Solids: 48 ± 2%
Weight per Gallon: 9.9 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification: TT-P-1511B, Type II

SPECIFICATIONS

Aluminum
2 cts. ProMar 200 Interior Latex Gloss Enamel
Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. ProMar 200 Interior Latex Gloss Enamel
Block
1 ct. PrepRite Block Filler
2 cts. ProMar 200 Interior Latex Gloss Enamel
Drywall
1 ct. PrepRite 200 Latex Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel
Plaster
1 ct. PrepRite Wall and Wood Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel
Masonry
1 ct. PrepRite Masonry Primer
or PrepRite Block Filler
2 cts. ProMar 200 Interior Latex Gloss Enamel
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. ProMar 200 Interior Latex Gloss Enamel
Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
or PrepRite Wall and Wood Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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101.40

PROMAR® 200

INTERIOR LATEX GLOSS ENAMEL

B21 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew - Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 1/4" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.017"-.021"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS

B21W201

Pigment by Weight	17%
Titanium Dioxide	17%
Vehicle by Weight	83%
Vinyl Acrylic Resin	29%
Water	45%
Glycol/Alcohols/Esters	7%
Additives	2%
Total	100%

CAUTIONS

For interior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. WARNING: This product contains a chemical(s) known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB412

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SUPERPAINT®

EXTERIOR HIGH GLOSS LATEX ENAMEL

A85 SERIES

CHARACTERISTICS

SuperPaint Latex High Gloss Enamel

Recommended for:
- Doors
- Windows
- Trim
- Shutters

Use on:
- Wood
- Metal—Aluminum, Galvanized, Primed Steel
- Masonry, Cement, Brick, Block
- Stucco
- Vinyl trim, Shutters

Superior Performance in:
- Block Resistance
- Moisture Resistance
- Gloss Retention
- Flow and Leveling

Color: All exterior ColorAnswers colors
Coverage: 400 sq ft/gal
@4 mils wet: 1.32 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Tack Free: 4 hours
Recoat: 24 hours
Flash Point: 201°F, PMCC
Finish: 70+ units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Red Base	4-8	100%
Neutral Base	8-12	100%
Package colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (less exempt solvents):
118 grams/liter; 0.98 lbs/gal
Volume Solids: 43 ± 2%
Weight Solids: 54 ± 2%
Weight per Gallon: 10.3 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification: TT-E-2784A, Type I, Gloss

SPECIFICATIONS

Aluminum
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Vinyl
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and nail holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned.

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Continued on back

SUPERPAINT®

EXTERIOR HIGH GLOSS LATEX ENAMEL

A85 SERIES

SURFACE PREPARATION

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew - Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS

A85W507

Pigment by Weight	15%
Titanium Dioxide	15%
Vehicle by Weight	85%
Acrylic Resin	48%
Styrene Acrylic	6%
Water	24%
Glycol	4%
Additives	3%
Total	100%

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8"-1/2" SherFab roller cover.

Spray—Airless

Pressure	2000 psi
Tip	.013"-.017"
Reduction	none

SuperPaint High Gloss Enamel sets up very quickly, providing painted surfaces which resists sticking together (blocking). When used at normal temperature and humidity, windows and doors can be closed after 4 hours drying. Maximum blocking resistance is achieved after 24 hours. With this benefit, some adjustments to your painting approach must be made.

- Do not paint in direct sun. Temperatures over 80°F and humidities under 30% will make the paint set up quicker.
- Do not over-work the product. Load paint on the surface, spread to cover, smooth out with long, even strokes. Finish this area before moving to a new area. Do not attempt to brush back into and further uniform an area once finished.
- Work quickly to maintain a wet edge.
- Paint objects in a vertical position to reduce the collection of airborne dirt and dust on the drying paint.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.
Do not shake excessively.
Not for use on roofs, floors, or decks.
Do not use Red, Yellow, or Violet Blend-A-Color Toner for exterior use.

LABEL CAUTION

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB528-4/98

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www.sherwin-williams.com

EVERCLEAN®
INTERIOR LATEX SATIN
A97 SERIES

CHARACTERISTICS

EverClean® Interior Latex Satin is a specially formulated paint providing the washability and durability usually found in glossy enamel finishes. It allows most household stains to be removed without the need for scrubbing.

Color: Most ColorAnswers® colors
Coverage: 350 - 400 sq. ft./gal. @ 4 mils wet; 1.5 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 85°
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Extra White	0-4	special formulas
Pure White	0-4	special formulas
Midtone Base	4-8	100%
Luminous White	0-5	125%

Vehicle Type: Acrylic
A97W51
VOC: 186 grams/liter; 1.55 lb/gal
Volume Solids: 38 ± 2%
Weight Solids: 51 ± 2%
Weight per Gallon: 10.7 lb

Meets the performance requirements, not necessarily composition, of Federal Specification:
TT-P-2119, Class II

SPECIFICATIONS

Aluminum
2 cts. EverClean Interior Latex Satin
Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. EverClean Interior Latex Satin
Block
1 ct. PrepRite Block Filler
2 cts. EverClean Interior Latex Satin
Drywall
1 ct. PrepRite Classic Primer
2 cts. EverClean Interior Latex Satin
Plaster
1 ct. PrepRite Classic Primer
2 cts. EverClean Interior Latex Satin
Masonry
1 ct. PrepRite Masonry Primer
2 cts. EverClean Interior Latex Satin
Steel
1 ct. All Surface Enamel Primer
2 cts. EverClean Interior Latex Satin
Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Satin

Mildew Resistant
This product contains agents which inhibit the growth of mildew on the surface of this paint film

WASHABILITY TEST —ASTM D3450-90
"Coating will retain, on average, greater than 80.0% reflectance after standardized soilant has been washed with either an abrasive or nonabrasive cleanser for 100 cycles when tested in accordance with ASTM D3450-90"

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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101.10

EverClean®

Interior Latex Satin
A97 Series

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper or other abrading method. Bare steel must be primed the same day as cleaned.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with ProClean Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

APPLICATION

Apply at temperatures above 50°F.
No reduction needed.

Brush
Use a nylon/polyester brush.

Roller
Use a 3/8" - 1/2" nap Soft Woven roller cover only.

Spray—Airless
Pressure .... 2000 psi
Tip .... .015"-.019"
For touching-up, reduce the product by one pint per gallon.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. Flush spray equipment after cleaning with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

CAUTION contains CRYSTALLINE SILICA. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
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LowTemp 35™

Exterior Latex Satin
B17 Series

CHARACTERISTICS

LowTemp 35 Exterior Latex Satin is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time @ 50% RH:
temperature and humidity dependent

	@ 35-45°F	**@ 45-60°F**
Touch:	2 hours	2 hours
Recoat:	48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic
B17W410
VOC: 102 grams/liter; 0.85 lb/gal
Volume Solids: 35 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.3 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification: TT-P-19D

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate	**Primer**
Aluminum[1]	no primer necessary
Block	Loxon Block Surfacer
Brick	Masonry Conditioner or ProMar Masonry Conditioner
Exterior Drywall	LowTemp 35 Exterior Latex Primer
Galvanized Steel[1]	no primer necessary
Masonry/Cement/Stucco	LowTemp 35 Exterior Latex Primer Loxon Ext. Acrylic Masonry Primer[2]
Plywood	LowTemp 35 Exterior Latex Primer
Preprimed Metal Siding[1]	DTM Bonding Primer[2]
Steel, alkyd primer[1]	All Surface Enamel Oil Primer
Steel, latex primer[1]	All Surface Enamel Latex Primer[2]
Vinyl Siding	no primer necessary
Wood, Composition Board	LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.
[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.
Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

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LowTemp 35™

Exterior Latex Satin

B17 Series

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.
No reduction necessary.
Brush
Use a nylon/polyester brush.
Roller
Use a 3/8" - 3/4" nap synthetic cover.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.
Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.
On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS

CAUTION contains CRYSTALLINE SILICA and ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
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102.11

A-100®
EXTERIOR LATEX SATIN
A82 SERIES

CHARACTERISTICS

A-100 Exterior Latex Satin is our best quality exterior satin finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time, @77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Error re MSDS

Vehicle Type: Acrylic
VOC (less exempt solvents): 38 grams/liter; 0.32 lb/gal
Volume Solids: 33 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.4 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-P-96D (cancelled)
TT-P-1510A (cancelled)

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Latex Satin
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Latex Satin
Brick
1 ct. Masonry Conditioner
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Cement Composition Siding/Panels
1 ct. Loxon Ext. Acrylic Masonry Primer
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Galvanized Steel
2 cts. A-100 Exterior Latex Satin
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Latex Satin
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Latex Satin
Vinyl Siding
2 cts. A-100 Exterior Latex Satin
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel— Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall— Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Cement Composition Siding/Panels
Clean thoroughly. Do not pressure wash, the pressure may damage the panels. Allow the surface to dry thoroughly. Prime bare panels with an acrylic primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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102.11

A-100®

EXTERIOR LATEX SATIN
A82 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A82W510

Pigment by Weight	25%
Titanium Dioxide	20%
Zinc Oxide	2%
Silica/Silicates	3%
Vehicle by Weight	75%
Acrylic Resin	20%
Water	49%
Additives	6%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

102.21

A-100®

EXTERIOR GLOSS LATEX
A8 SERIES

CHARACTERISTICS

A-100 Exterior Latex Gloss is our best quality exterior gloss finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.3 mils dry
Drying Time, @77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 24 hours
Flash Point: 201°F, PMCC
Finish: 35-45 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
BaseA, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (as packaged):
132 grams/liter; 1.06 lbs/gal
Volume Solids: 33 ± 2%
Weight Solids: 44 ± 2%
Weight per Gallon: 10.0 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Gloss Latex
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Gloss Latex
Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. A-100 Exterior Gloss Latex
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex
Galvanized Steel
2 cts. A-100 Exterior Gloss Latex
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Gloss Latex
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. A-100 Exterior Gloss Latex
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Gloss Latex
Vinyl Siding
2 cts. A-100 Exterior Gloss Latex
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Gloss Latex

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/ spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Continued on back

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A-100®

EXTERIOR GLOSS LATEX
A8 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.019" - .021"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A8W16

Pigment by Weight	19%
Titanium Dioxide	17%
Zinc Oxide	2%
Vehicle by Weight	81%
Acrylic Resin	23%
Water	52%
Glycol/Alcohol/Esters	4%
Mildewcide	0.2%
Additives	1.8%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
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— Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number (216) 566-2917
Information telephone number (216) 566-2902
Date of preparation March 1, 1998

Latex Exterior Finishes - A-100® Latex Exterior Finishes

LE/3

— Section 2 —

CAS No.	Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	FLAT	SATIN	GLOSS	EXT. WOOD PRIMER
						A6 B 550 Tricorn Black A6 W 16 White A6 G 514 Base C A6 W 501 Perma White A6 N 507 Chateau Brown A6 W 515 Base A A6 N 556 Plantation Brown A6 W 520 UltraDeep (A6 R 503) Rustic Red A6 W 596 Tinting White A6 Y 554 Yellow Corn A6 Y 516 Base B A6 R 533 Burgundy	A82 B 550 Tricorn Black A82 W 510 White A82 G 514 Base C A82 W 515 Base A A82 N 507 Chateau Brown A82 W 596 Tinting White A82 N 556 Plantation Beige A82 Y 516 Base B A82 R 533 Burgundy A82 Y 554 Yellow Corn A82 W 501 Perma White	A8 B 512 Tricorn Black A8 W 524 Perma White A8 G 531 Base C A8 W 525 Tinting White A8 N 503 Plantation Brown A8 W 541 Base A A8 N 515 Chateau Brown A8 Y 520 Yellow Corn A8 R 533 Burgundy Base A8 Y 558 Base B A8 W 16 White	B42 W 41 Wood Primer
107-21-1	§ Ethylene Glycol.	C 50	50	PPM	0.1	0 - 4	< 3% may be added due to tinting		2
112-34-5	§ 2-(2-Butoxyethoxy)-ethanol	Not Established			0.1			1 - 2	1
64742-54-7	Heavy Paraffinic Oil.	5	5	Mg/M3	as Mist		1 in Tricorn Black only	1 in Base C only	
14808-60-7	Quartz	0.1	0.1	Mg/M3	as Resp. Dust	6 - 24	0.0 - 0.1		0.2
14464-46-1	Cristobalite	0.05	0.05	Mg/M3	as Resp. Dust	1 - 2	0.5 - 2	0.1 - 0.8	2
1332-58-7	Kaolin	2	5	Mg/M3	as Resp. Dust	**Numbers In Boxes Are Percent By Weight**	2 - 4	0 - 2	
14807-96-6	Talc	2	2	Mg/M3	as Resp. Dust				7
13463-67-7	Titanium Dioxide.	10	10[5]	Mg/M3 [Resp. Fraction]	as Dust	0 - 18	0 - 19	0 - 17	15
1314-13-2	Zinc Oxide	10	10[5]	Mg/M3 [Resp. Fraction]	as Dust	0 - 2	0 - 3	0 - 2	
1333-86-4	Carbon Black.	3.5	3.5	Mg/M3		0 - 2	0 - 2	0 - 2	
	§ Antimony Compound. [% Antimony]					8 [1.0] in Yellow Corn only	8 [1.0] in Yellow Corn only	8 [1.0] in Yellow Corn only	
	§ Nickel Compound. [% Nickel]					8 [0.3] in Yellow Corn only	8 [0.3] in Yellow Corn only	8 [0.3] in Yellow Corn only	
	§ Zinc Compound. [% Zinc]					0 [0.0] - 2 [2.0]	0 [0.0] - 3 [2.0]	0 [0.0] - 2 [1.7]	
	Weight per Gallon (lbs.)					10.0 - 11.1	8.9 - 10.4	8.8 - 10.0	10.9
	Percent Water					46.7 - 54.5	49.9 - 59.5	51.2 - 58.0	45.3
	VOC (Volatile Organic Compounds) Total - lbs./gal.					0.3 - 0.5	0.3 - 0.3	0.4 - 0.5	0.4
	VOC Less Water & Federally Exempt Solvents - lbs./gal.					0.8 - 1.3	0.8 - 0.9	1.1 - 1.3	1.0
	Flash Point (°F) / HMIS (NFPA) Rating (health - flammability - reactivity)					None 2* - 0 - 0	None 2*0 0 -	None 2* - 0 - 0	None 2* - 0 -

Section 3 —Physical Data

PRODUCT WEIGHT	See TABLE	*EVAPORATION RATE*	Slower than Ether
SPECIFIC GRAVITY	1.05-1.41	*VAPOR DENSITY*	Heavier than Air
BOILING RANGE	212-477 °F	*MELTING POINT*	N.A.
VOLATILE VOLUME	57-75 %	*SOLUBILITY IN WATER*	N.A.
pH	8.5-9.5	*PHOTOCHEMICALLY REACTIVE*	No

Section 4 — Fire And Explosion Hazard Data

FLAMMABILITY CLASSIFICATION *FLASH POINT* Not Applicable *LEL* N.Ap. *UEL* N.Ap.
Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 5 —Health Hazard Data

ROUTES OF EXPOSURE
Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. To minimize exposure, follow recommendations for proper use, ventilation, and personal protective equipment.

ACUTE Health Hazards

EFFECTS OF OVEREXPOSURE
Irritation of eyes, skin and upper respiratory system. In a confined area vapors in high concentration may cause headache, nausea or dizziness.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED:	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN:	Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.
If in EYES:	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If SWALLOWED:	Get medical attention.

CHRONIC Health Hazards

Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.

Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on experimental animal data, however, there is insufficient evidence in humans for its carcinogenicity.

Ethylene Glycol is considered an animal teratogen. It has been shown to cause birth defects in rats and mice at high doses when given in drinking water or by gavage. There is no evidence to indicate it causes birth defects in humans.

Prolonged overexposure to solvent ingredients in Section II may cause adverse effects to the liver and urinary systems.

Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Section 6 — Reactivity Data

STABILITY – Stable

CONDITIONS TO AVOID
None known.

INCOMPATIBILITY
None known.

HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION – Will Not Occur

Section 7 — Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD
Waste from these products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 — Protection Information

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

These coatings may contain materials classified as nuisance particulates (listed "as Dust" in Section II) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section II, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).

VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section II.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Section 9 — Precautions

DOL STORAGE CATEGORY – Not applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 10 — Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: A6B550, A6G514, A6N507, A6N556, A6W16, A6W501, A6W515, A6W520, A6W596, A6Y516, A16G203, A16R201, A16W200, A16W201, A16Y202, A80B512, A80G503, A80N510, A80N511, A80W501, A80W506, A80W507, A80Y502, A82B550, A82G514, A82N507, A82N556, A82W501, A82W510, A82W515, A82W596, A82Y516, A85B512, A85R530, A85W501, A85W506, A85W507, A89B512, A89G503, A89N511, A89W501, A89W506, A89W507, A89Y502, B15B250, B15W201, B15W215, B15W296, B17B450, B17G414, B17W415, B17W496, B17Y416, B42W41, C1W501 and C1W502 contain a chemical known to the State of California to cause cancer.

A6R503, A6R533, A6Y554, A8B512, A8G513, A8N503, A8N515, A8R533, A8W16, A8W524, A8W525, A8W541, A8W502, A8Y558, A16R233, A80Y508, A80R533, A82R533, A82Y554, A84B512, A84G503, A84N510, A84N511, A84R533, A84W501, A84W506, A84W507, A84Y502, A84Y508, A85G503, A85R533, A85T504, A85Y502, A89N510, A89R533, A89Y508, B15G214, B15R233, B15Y216, B17R433, B17W410, B22G100, B22N102, B22R101, B22R133, B22W101, B22W102, B22Y100, B36G300, B36R533, B36W300, B36W301, B36W302, B36W306, B36Y300, B36Y304, B77G500, B77R533, B77W501, B77W502, B77W506, and B77Y500 contain chemicals known to the State of California to cause cancer.

TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of these products. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Industrial and Marine Coatings

NSF®

Certified to ANSI/NSF 61

TANK CLAD HS

PART A	B62W80	SANITARY WHITE
PART A	B62L80	LIGHT BLUE
PART B	B60V80	HARDENER

PRODUCT INFORMATION

Revised 1/2000

PRODUCT DESCRIPTION

TANK CLAD HS is a VOC compliant, 80% solids epoxy coating formulated specifically as an interior lining for pipes and tanks containing potable water, fresh water, and salt water. May also be used as part of a system for tank exteriors.

- NSF approved to Standard 61 for potable water (tanks 60,000 gallons and larger)
- Suitable for use in USDA inspected facilities
- Chemical resistant
- Excellent immersion service
- Direct to metal application for tanks and structural steel
- Corrosion resistant

RECOMMENDED USES

For use on prepared steel or concrete surfaces exposed to continuous immersion in potable water.

Lining system for the interior of steel tanks and concrete reservoirs used for potable water, water treatment, and marine immersion service. Meets requirements of AWWA C210-92 for coating systems for the interior and exterior of steel water pipelines. Meets NSF Standard 61 requirements for use in potable water storage tanks.
Acceptable for use with cathodic protection systems.
Conforms to AWWA D102-97 Inside Coating System #1, #2, and #3.

PRODUCT CHARACTERISTICS

Finish:	Semi-gloss	
Color:	Sanitary White, Light Blue	
Volume Solids:	80% ± 2%, mixed	
Weight Solids:	90% ± 2%, mixed	
VOC (EPA Method 24): mixed	Unreduced	177 g/L; 1.48 lb/gal
	Reduced 10%:	240 g/L; 2.00 lb/gal
Mix Ratio:	2 component, premeasured 4:1	

Recommended Spreading Rate per coat:

Wet mils:	6.0 - 10.0
Dry mils:	5.0 - 8.0*
Coverage:	160 - 255 sq ft/gal approximate

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

* See Recommended Systems

Drying Schedule @ 10.0 mils wet @ 50% RH:

	@ 55°F	**@ 77°F**	**@ 120°F**
To touch:	7 hours	3 hours	1 hour
Tack free:	8 hours	4 hours	2 hours
To recoat:			
minimum:	48 hours	18 hours	4 hours
maximum:	60 days	60 days	60 days
To cure:	14 days	7 days	3 days
Pot Life:	4 hours	2 hours	30 minutes
Sweat-in Time:	30 minutes	15 minutes	not required

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.

For **Potable Water Service,** allow a minimum cure time of 7 days (@ 77°F) prior to placing into service, sterilize and thoroughly rinse with potable water. See methods outlined in AWWA C652-92.

Shelf Life:	36 months, unopened, at 77°F
Flash Point:	80°F, PMCC, mixed
Reducer/Clean Up:	Xylene, R2K4

PERFORMANCE CHARACTERISTICS

System Tested: (unless otherwise indicated)
Substrate: Steel
Surface Preparation: SSPC-SP10
2 cts. Tank Clad HS @ 6.0 mils dft/ct

Abrasion Resistance:
Method: ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load
Result: 120 mg loss

Adhesion:
Method: ASTM D4541
Result: 1000 psi

Direct Impact Resistance: (on cold rolled steel)
Method: ASTM D2794
Result: 30 in. lbs.

Dry Heat Resistance:
Method: ASTM D2485 (discolors)
Result: 200°F

Exterior Durability:
Method: 1 year at 45° South
Result: Excellent, chalks

Flexibility: (on cold rolled steel)
Method: ASTM D522, 180° bend, 1" mandrel
Result: Passes

Moisture Condensation Resistance:
Method: ASTM D4585, 100°F, 1000 hours
Result: No blistering, underfilm corrosion, or rust creepage observed

Pencil Hardness:
Method: ASTM D3363
Result: 4H

Salt Fog Resistance:
Method: ASTM B117, 1000 hours
Result: No blistering, underfilm corrosion, or rust creepage observed.

Epoxy coatings may darken or yellow following application and curing.

continued on back

SHERWIN WILLIAMS®

Industrial and Marine Coatings

NSF®

Certified to ANSI/NSF 61

4.79

TANK CLAD HS

PART A	B62W80	SANITARY WHITE
PART A	B62L80	LIGHT BLUE
PART B	B60V80	HARDENER

PRODUCT INFORMATION

RECOMMENDED SYSTEMS

Steel, potable water service:
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Steel:
1 ct. Steel Seam Epoxy @ 55 - 65 mils dft
(as required to seal seams and radius joints)
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

*** Steel, Shop Applied system, New Construction, AWWA D102:**
1 ct. Tank Clad HS @ 3.0 - 8.0 mils dft
1 ct. Tank Clad HS @ 5.0 - 8.0 mils dft

Concrete:
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Concrete, fresh water service:
1 ct. Kem Cati-Coat HS Epoxy Filler/Sealer @ 10.0 - 20.0 mils dft, as required to fill voids and provide a continuous substrate
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Steel, atmospheric service:
1-2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Steel, atmospheric service:
1 ct. Tank Clad HS @ 5.0 - 8.0 mils dft
2 cts. Hi-Solids Polyurethane @ 3.0 - 4.0 mils dft/ct

Sher-Plate Epoxy Patching and Grout Compound can be used for smoothing and sealing welds, rivets, and chine areas.

The systems listed above are representative of the product's use. Other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel:	
Atmospheric:	SSPC-SP6
Immersion:	SSPC-SP10, 2-3 mil profile
Concrete & Masonry:	
Atmospheric:	SSPC-SP 13/Nace 6
Immersion:	SSPC-SP 13/Nace 6-4.3.1 or 4.3.2

COLOR AVAILABILITY/TINTING

Do not tint.

Color: Sanitary White, Light Blue.

APPLICATION CONDITIONS

Temperature:	55°F minimum, 120°F maximum (air, surface, and material) At least 5°F above dew point
Relative humidity:	85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	5 gallons mixed
Part A:	4 gallons in a 5 gallon container
Part B:	1 gallon
Weight per gallon:	14.4 ± 0.2 lb, mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

SHERWIN WILLIAMS

Industrial and Marine Coatings

NSF

Certified to ANSI/NSF 61

4.79A

TANK CLAD HS

PART A	**B62W80**	SANITARY WHITE
PART A	**B62L80**	LIGHT BLUE
PART B	**B60V80**	HARDENER

APPLICATION BULLETIN

Revised 1/2000

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel (immersion service)

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils). Remove all weld spatter and round all sharp edges by grinding to a minimum 1/4" radius. Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Iron & Steel (atmospheric service)

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Poured Concrete

New

For surface preparation, refer to SSPC-SP13/NACE 6. Surfaces must be clean, dry, sound and offer sufficient profile to achieve adequate adhesion. Minimum substrate cure is 28 days at 75°F. Remove all form release agents, curing compounds, salts, efflorescence, laitance, and other foreign matter by sandblasting, shotblasting, mechanical scarification, or suitable chemical means such as muriatic acid etch, refer to ASTM D4260. Rinse thoroughly to achieve a final pH between 6.0 and 10.0. Allow to dry thoroughly prior to coating

Old

Surface preparation is done in much the same manner as new concrete, however, if the concrete is contaminated with oils, grease, chemicals, etc., they must be removed by cleaning with a strong detergent. Refer to ASTM D4258. Form release agents, hardeners, etc. must be removed by sandblasting, shotblasting, mechanical scarification, or suitable chemical means. If surface deterioration presents an unacceptably rough surface, Kem Cati-Coat HS Epoxy Surfacer is recommended to patch and resurface damaged concrete.

Fill all cracks, voids and bugholes with SherPlate Epoxy Patch.

Always follow the ASTM methods listed below:

ASTM D4258 Standard Practice for Cleaning Concrete.

ASTM D4259 Standard Practice for Abrading Concrete.

ASTM D4260 Standard Practice for Etching Concrete.

ASTM D4263 Plastic Sheet Method for Checking Moisture in Concrete.

SSPC-SP 13/Nace 6 Surface Preparation of Concrete

Immersion Service:

In addition to the above surface preparation, Brush Blasting of the concrete surface is required.

APPLICATION CONDITIONS

Temperature:	55°F minimum, 120°F maximum (air, surface, and material) At least 5°F above dew point
Relative humidity:	85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compatible with the existing environmental and application conditions.

Reducer/Clean up .... Xylene, R2K4

Use of any other solvent than Xylene, R2K4 may affect the performance or compliance of this product for its intended service.

Airless Spray

Pressure	2400 psi
Hose	3/8" ID
Tip	.015" - .019"
Filter	30 mesh
Reduction	as needed up to 10% by volume

Conventional Spray

Gun	Binks 95
Fluid Nozzle	66
Air Nozzle	68PB
Atomization Pressure	80 psi
Fluid Pressure	30 psi
Reduction	as needed up to 10% by volume

Brush

Brush	Natural Bristle
Reduction	not recommended

Roller

Cover	3/8" - 1/2" woven with phenolic core
Reduction	not recommended

If specific application equipment is listed above, equivalent equipment may be substituted.

continued on back

SHERWIN WILLIAMS®

Industrial and Marine Coatings

NSF®

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4.79A

TANK CLAD HS

PART A	B62W80	SANITARY WHITE
PART A	B62L80	LIGHT BLUE
PART B	B60V80	HARDENER

APPLICATION BULLETIN

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with power agitation. Make certain no pigment remains on the bottom of the can. Then combine four parts by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation. Allow the material to sweat-in as indicated. Re-stir before using.

If reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.

Apply paint to the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

Wet mils:	6.0 - 10.0
Dry mils:	5.0 - 8.0*
Coverage:	160 - 255 sq ft/gal approximate

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

* See Recommended Systems

Drying Schedule @ 10.0 mils wet @ 50% RH:

	@ 55°F	@ 77°F	@ 120°F
To touch:	7 hours	3 hours	1 hour
Tack free:	8 hours	4 hours	2 hours
To recoat:			
minimum:	48 hours	18 hours	4 hours
maximum:	60 days	60 days	60 days
To cure:	14 days	7 days	3 days
Pot Life:	4 hours	2 hours	30 minutes
Sweat-in Time:	30 minutes	15 minutes	not required

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.

For **Potable Water Service,** allow a minimum cure time of 7 days (@ 77°F) prior to placing into service, sterilize and thoroughly rinse with potable water. See methods outlined in AWWA C652-88.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and may cause lifting of old paint.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Xylene, R2K4.

Holiday Detection: Use a wet sponge-type detector such as KD Bird Dog or equivalent equipment per manufacturer's recommendation. Test only cured coating, as solvent entrapment in fresh films may provide false readings.

For **Potable Water Service,** allow a minimum cure time of 7 days (@ 77°F) prior to placing into service, sterilize and thoroughly rinse with potable water. See methods outlined in AWWA C652-92.

Refer to Product Information sheet for additional performance characteristics and properties.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Xylene, R2K4. Clean tools immediately after use with Xylene, R2K4. Follow manufacturer's safety recommendations when using any solvent.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

SHERWIN WILLIAMS®

MASONRY COATING SYSTEMS
Concrete Solutions. Solid Results.

108.11

LOXON®
EXTERIOR MASONRY ACRYLIC PRIMER
A24W300

CHARACTERISTICS

Loxon Exterior Acrylic Masonry Primer is an acrylic coating specifically engineered for exterior, above-grade, masonry surfaces requiring a high performance primer. It is highly alkali and efflorescence resistant. It reinforces the performance of exterior latex paints and can be used on concrete, concrete block, brick, and stucco. This may be applied to a surface with a pH of 6 to 13.

Color: White
Coverage:
  Recommended: 200 sq ft/gal @ 8 mils wet; 3.2 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
  Touch: 4 hours
  Recoat: 24 hours
Flash Point: 201°F, PMCC
Finish: 0-10 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
White	0-4	not controlled

Vehicle Type: Acrylic
VOC: 130 grams/liter; 1.09 lb/gal
Volume Solids: 40 ± 2%
Weight Solids: 53 ± 2%
Weight per Gallon: 10.7 lb

PHYSICAL PROPERTIES

Moisture Resistance MIL-P-14267B, 2 hour immersion	Passes
Wind-Driven Rain Test TT-C-555B, 98 m.p.h. wind velocity	Passes
Moisture Vapor Permeability ASTM D1653-72, 1 coat @ 3.8 mils dft	1.5 perms
Flexibility ASTM D1737, 180° bend, 1/8" mandrel	Passes
Tensile Strength 1 coat @ 3.8 mils dft	190 psi
Elongation 1 coat @ 3.8 mils dft	350%
Alkali Resistance TT-P-1511B 4.4.11	Passes
Mildew Resistance	Passes

SPECIFICATION

Concrete, Stucco, Block
1 ct. Loxon Exterior Acrylic Masonry Primer
2 cts. Appropriate latex topcoat

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.

Brush
Use a quality nylon/polyester brush.

Roller
Use a quality 1/2" to 1-1/2" nap synthetic roller cover.

Spray—Airless
Pressure .... 2000-2700 psi
Tip .... .019"
Reduction ....none

Spray—Conventional
Air Pressure .... 40-60 psi
Fluid Pressure ....20 psi
Cap/Tip 704/FX
Reduction .... up to 1 pint/gallon

SURFACE PREPARATION

Concrete/Stucco/Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Pressure clean (minimum 2100 psi) to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, peeling and defective coatings, chalks, etc. Allow the surface to dry before proceeding. Repair cracks, voids, and other holes with ConSeal Patches and Sealants

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

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Loxon®
Exterior Masonry Acrylic Primer
A24W300

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A24W300

Pigment by weight	29%
Titanium Dioxide	13%
Silica/Silicates	16%
Vehicle by weight	71%
Acrylic Resin	19%
Water	44%
Glycol	2%
Additives	6%
Total	100%

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.
Do not paint in direct sun or on a hot surface.
May be applied to damp but not to wet surfaces.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC. Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains chemicals known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

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PREPRITE™ 400
INTERIOR LATEX PRIMER
B28W400

Formerly
ProMar® 400 Interior Latex Wall Primer

CHARACTERISTICS

- Good value **wall** primer for general use under **flats** and **enamels** wall paints
- Ensures finish coat will cover when a moderate color change is required.
- Good drywall sealer

Use on interior:
- Drywall
- Masonry
- Concrete
- Previously Painted Surfaces

Color: White
Coverage: 400 sq ft/gal @4 mils wet; 1.1 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting - For better hiding of deeper colors, use up to 2 oz per gallon of Blend-A-Color Toner to approximate the topcoat color. Check color before use.
Vehicle Type: Vinyl Acrylic
VOC (as packaged):
63 grams/liter; 0.5 lbs/gal
Volume Solids: 29 ± 2%
Weight Solids: 43 ± 2%
Weight per Gallon: 10.4 lbs

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-650C, Type I

APPLICATION

Topcoat with architectural latex or oil finishes.
Do not apply at temperatures below 50°F.

Brush - No reduction necessary. Use a nylon/polyester brush.
Roller - No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad - No reduction necessary.
Spray - Airless
Pressure .... 2000 psi
Tip .... .017"-.021"
Reduction .... none

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with ProBlock Primer Sealer.

Drywall - Fill cracks and nail holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry Concrete, Cement - All surfaces must be cured. Remove all form release and curing agents. Masonry surfaces must be dry before priming. Moisture content must be 15% or lower, and the pH between 5 and 9.

Plaster - Must be cured, usually 30 days, and hard. If painting cannot wait, allow the surface to dry 7 days and prime with PrepRite Masonry Primer. Soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with water and allow to dry before painting.

Caulking - After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

Continued on back

PrepRite™ 400
INTERIOR LATEX PRIMER
B28W400

SURFACE PREPARATION

Mildew - remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

LABEL ANALYSIS
B28W400

Pigment by Weight	29%
Titanium Dioxide	5%
Silica/Silicates	24%
Vehicle by Weight	71%
Vinyl Acrylic Resin	12%
Water	55%
Additives	4%
Total	100%

CAUTIONS

For interior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
See label for additional cautions.

LABEL CAUTIONS

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.

Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.

DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure.

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

GB532

108.01

PREPRITE™ 200
INTERIOR LATEX PRIMER
B28W200

Formerly
ProMar® 200 Interior Latex Wall Primer

CHARACTERISTICS

- Best quality **wall** primer for general purpose use under flats and enamels
- Excellent coverage
- **Excellent drywall sealer**
- Covers dark colors, excellent for dramatic topcoat color changes

Use on interior:

- Drywall
- Masonry
- Concrete
- Previously Painted Surfaces

Color:	White
Coverage:	400 sq ft/gal @4 mils wet; 1.1 mils dry

Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent

Touch:	1 hour
Recoat:	4 hours
Flash Point:	@ 77°F, PMCC
Finish:	0-5 units @ 85°
Solvent/Reducer:	Water

Tinting - For better hiding of deeper colors, use up to 2 oz per gallon of Blend-A-Color Toner to approximate the topcoat color. Check color before use.

Vehicle Type:	Vinyl Acrylic

error
see
MSDS

VOC (as packaged):
26 grams/liter; 0.22 lbs/gal

Volume Solids:	28 ± 2%
Weight Solids:	43 ± 2%
Weight per Gallon:	10.6 lbs

Meets the performance requirements, not necessarily composition, of Federal Specification: TT-P-650, Type I

APPLICATION

Topcoat with latex, oil, water based epoxy, or solvent based epoxy on architectural applications.
Do not apply at temperatures below 50°F.

Brush - No reduction necessary. Use a nylon/polyester brush.
Roller - No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad - No reduction necessary.
Spray - Airless

Pressure	2000 psi
Tip	.017"-.021"
Reduction	none

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with ProBlock Primer Sealer.

Drywall - Fill cracks and nail holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry Concrete, Cement - All surfaces must be cured. Remove all form release and curing agents. Masonry surfaces must be dry before priming. Moisture content must be 15% or lower, and the pH between 5 and 9.

Plaster - Must be cured, usually 30 days, and hard. If painting cannot wait, allow the surface to dry 7 days and prime with PrepRite Masonry Primer. Soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with water and allow to dry before painting. PrepRite 200 Latex Wall Primer is recommended on plaster only under solvent based epoxies.

Caulking - After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

Continued on back

PREPRITE™ 200

INTERIOR LATEX PRIMER

B28W200

SURFACE PREPARATION

Mildew - remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

LABEL ANALYSIS

B28W200

Pigment by Weight	31%
Titanium Dioxide	12%
Silica/Silicates	19%
Vehicle by Weight	69%
Vinyl Acrylic Resin	11%
Water	54%
Additives	4%
Total	100%

CAUTIONS

For interior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.

LABEL CAUTIONS

Caution contains CRYSTALLINE SILICA

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.

Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.

DELAYED EFFECTS FROM LONG TERM OVER-EXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure.

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

GB532

— Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number	(216) 566-2917
Information telephone number	(216) 566-2902
Date of preparation	March 10, 1998

PrepRite™ Latex Interior /Exterior Finishes

PR

CAS No.	— Section 2 — Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	Int./Ext. Block Filler	Classic Interior Latex Primer	200 Interior Latex Primer	Interior Acrylic Masonry Primer	400 Interior Latex Wall Primer	High Build Interior Latex Primer/ Surfacer	ProBlock™ Int./Ext. Primer/Sealer	Anchor-Bond™ Adhestion Promoting Primer
						B25 W 25	B28 W 101 White	B28 W 200 White	B28 W 300 White	B28 W 400 White	B28 W 601 White	B51 W 20 White	B51 W 5
107-21-1	§ Ethylene Glycol.	C 50	50	PPM	0.1						1		
14808-60-7	Quartz	0.1	0.1	Mg/M3	as Resp. Dust		3	2	12	0.8	7		9
14464-46-1	Cristobalite	0.05	0.05	Mg/M3	as Resp. Dust		0.9		1			0.6	
1332-58-7	Kaolin	2	5	Mg/M3	as Resp. Dust	7				9			
14807-96-6	Talc	2	2	Mg/M3	as Resp. Dust		4	5		5		3	
12001-26-2	Mica	3	3	Mg/M3	as Resp. Dust		3						4
471-34-1	Calcium Carbonate.	10	15[5]	Mg/M3 [Resp.	as Dust Fraction]	51					7		11
13463-67-7	Titanium Dioxide.	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]	2	16	12	13	5	4	16	9
1314-13-2	Zinc Oxide	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]								1
	[% Barium]											[0.3]	
	§ Zinc Compound. [% Zinc]												2 [1.4]
	Weight per Gallon (lbs.)					13.62	11.55	10.59	10.53	10.34	10.61	11.17	11.07
	Percent Water					28.5	40.8	54.5	43.5	55.1	59.0	44.4	41.7
	VOC (Volatile Organic Compounds) Total - lbs./gal.					0.24	0.33	0.22	0.49	0.15	0.14	0.34	0.15
	VOC Less Water & Federally Exempt Solvents - lbs./gal.					0.45	0.77	0.72	1.10	0.50	0.60	0.84	0.34
	Photochemically Reactive					No	No	No	No	No	No	No	No
	Flash Point (°F)					None	None	None	None	None	None	None	None
	HMIS (NFPA) Rating (health - flammability - reactivity)					1 - 0 - 0	1* - 0 - 0	1* - 0 - 0	1* - 0 - 0	1* - 0 - 0	2* - 0 - 0	1* - 0 - 0	1* - 0 -

Numbers In Boxes Are Percent By Weight

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFB72.65 C

→→→ *MSDS Text Page Follows* →→→

PrepRite™ Latex Interior /Exterior Finishes

Section 3 —Physical Data

PRODUCT WEIGHT	See TABLE	*EVAPORATION RATE*	Slower than Ether
SPECIFIC GRAVITY	1.24-1.64	*VAPOR DENSITY*	Heavier than Air
BOILING RANGE	212-477 °F	*MELTING POINT*	N.A.
VOLATILE VOLUME	49-76 %	*SOLUBILITY IN WATER*	N.A.
pH	9.0-10.0		

Section 4 —Fire And Explosion Hazard Data

FLAMMABILITY CLASSIFICATION *FLASH POINT* See TABLE *LEL* N.Ap. *UEL* N.Ap.

Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 5 —Health Hazard Data

ROUTES OF EXPOSURE

Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. To minimize exposure, follow recommendations for proper use, ventilation, and personal protective equipment.

ACUTE Health Hazards

EFFECTS OF OVEREXPOSURE

Irritation of eyes, skin and upper respiratory system. In a confined area vapors in high concentration may cause headache, nausea or dizziness.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED:	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN:	Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.
If in EYES:	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If SWALLOWED:	Get medical attention.

CHRONIC Health Hazards

Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.

Ethylene Glycol is considered an animal teratogen. It has been shown to cause birth defects in rats and mice at high doses when given in drinking water or by gavage. There is no evidence to indicate it causes birth defects in humans.

Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver and urinary systems.

Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Section 6 —Reactivity Data

STABILITY – Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide, Oxides of Metals in Section 2

HAZARDOUS POLYMERIZATION Will Not Occur

Section 7 —Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Waste from *B51W20* may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Waste must be tested for extractability to determine the applicable EPA hazardous waste numbers.

Waste from other products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Incinerate all products in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 —Protection Information

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

These coatings may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding, wirebrushing, abrading, burning or welding the dried film, wear a particulate respirator approved by NIOSH/MSHA for protection against non-volatile materials in Section 2.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Section 9 —Precautions

DOL STORAGE CATEGORY – Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 10 —Other Regulatory Information

CALIFORNIA PROPOSITION 65

WARNING: B28W300 contains a chemical known to the State of California to cause cancer. B25W25, B28W101, B28W200, B28W400, B28W601, B51W20 and B51W50 contain chemicals known to the State of California to cause cancer.

TSCA CERTIFICATION

All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

DATA ISSUES
APPENDIX E

SHER-WOOD® CAB-ACRYLIC LACQUER

SHER-W00D® CAB-Acrylic Lacquer is formulated to meet the water white and non-yellowing demands of the furniture, kitchen cabinet, and wood finishing markets. It is intended as a clear topcoat over white, "pickled" or light pastel stains where the best non-yellowing properties are required. Cellulose Acetate Butyrate (CAB)-Acrylic presents the best chemistry of lacquers for resistance to yellowing.

Advantages:

- Meets the federal HAPS rule for wood products as packaged*
- Water-white color
- Excellent resistance to yellowing - superior to all nitrocellulose compositions
- Meets KCMA specifications when applied over SHER-WOOD Vinyl Sealer T67F3
- VOC under 5.6 lb/gal
- Fast drying - similar to nitrocellulose lacquers
- May be used directly over solid color lacquers as a "scuff coat"
- Excellent film clarity and color retention
- Application by conventional, airless or air assisted airless spray equipment
- Excellent print resistance after overnight dry
- May be used as a shading lacquer or toner by adding small quantities of Chroma Chem 844 colorants or SHER-WOOD Dye Stains

SHER-WOOD® KEM AQUA® LACQUER

SHER-WOOD® KEM AQUA® Lacquer is a high quality, water reducible, acrylic latex, clear system for finishing furniture, cabinets and a wide variety of wood and novelty items without the hazards associated with nitrocellulose lacquer and highly flammable solvents. It offers improved clarity and ease of handling over other latex coatings and meets all current EPA regulations for volatile organic compounds emissions for wood finishing.

Advantages:

- Meets KCMA specifications
- Very low VOC under 2.0 lb/gal less water
- Very low volatile organic emissions - less than 1.0 lb/gal
- Excellent film clarity - like solvent based nitrocellulose lacquers
- Meets the Federal HAPS rule for Wood Finishes as packaged*
- Complete water system that handles and performs much like a lacquer
- Excellent mar resistance
- Better resistance to microfoaming than other latex clears
- Minimizes tannin bleed discoloration when used with Sher-Wood Kem Aqua Lacquer Sanding
- Sealer T65F520
- Dries to handle and sand in 30 minutes at room temperature
- Very good hardness, block resistance, and print resistance
- Offers greater safety to the user because it does not contain the volatile flammable organic

solvents typical of lacquers
Contains water. Reduced with water
Excellent resistance to blushing
No flash point

*National Standards for Hazardous Air Pollutants (HAPS) Emissions for Wood Furniture Manufacturing Operations, CFR 40, Part 63, Subpart JJ

SHERWIN WILLIAMS

111.50

CUPRINOL®

CLEAR DECK & WOOD SEAL

DESCRIPTION

Clear Deck and Wood Seal

- Powerful oil-based formula specially engineered for pressuretreated wood, redwood, and cedar.
- Powerful water repellents to seal water out and protect against cracking, splitting, warping, swelling and pigment wash off.
- Contains special ingredients to make water bead up and roll off to protect wood.
- Leaves protective coating that resists discoloration caused by mildew.
- Allows wood to gray and weather naturally.
- Advanced waterborne formula is safe to use, odorless and nonflammable.
- Apply immediately to absorbent pressure-treated wood.
- Provides oil-based protection with the ease of water cleanup.
- Recommended for use on wood siding, fences, decks and outdoor furniture.
- Easy to use - apply with spray, brush or pad; conveniently cleans up with soap and water.
- Formulated to meet the strictest Volatile Organic Compound (VOC) air pollution regulations in the United States.

CHARACTERISTICS

Color:	Clear
Coverage:	
Recommended:	200-300 sq ft/gal no dry surface film
Drying Time, @ 77°F 50% RH:	
temperature and humidity dependent	
Touch:	12 hours
Recoat:	2 hours

Due to the composition of Clear Deck and Wood Seal, if a second coat is needed, apply it within 2 hours of the first coat. If this 2 hour window is exceeded, the second coat will not penetrate and adhere properly. The surface must weather until water will not bead up on the surface before applying another coat.

Flash Point:	201°F (PMCC)
Finish:	no surface film
Solvent:	Water
Vehicle Type:	Alkyd
VOC: (Total)	27 g/L; 0.23 lb/gal
(less water)	283 g/L; 2.36 lb/gal
Volume Solids:	6.4 ± 2%
Weight Solids:	6.7 ± 2%
Weight per Gallon:	8.3 lbs

CLEAN UP INFORMATION

Clean brushes and tools with soap and warm water immediately after use. If clean up is delayed use hot soapy water.

SURFACE PREPARATION

On all wood surfaces, use Cuprinol Revive® Deck Cleaner or Cuprinol Liquid Deck Wash to remove stains caused by dirt, mildew and algae. Test absorbency by sprinkling a few drops of water on the wood to be treated. If the water is rapidly absorbed, the surface is ready for product application; if not, wait a few weeks and test again.

Note: This test is especially recommended for pressure-treated wood and smooth cedar. It is critical to ensure proper penetration of the product. Surfaces must be clean, dry, absorbent, and structurally sound.

Some woods, specifically cedar and redwood, contain resins which may "bleed" to the surface, resulting in a discoloration of the wood. If this occurs, clean with a 10% oxalic acid/90% water solution.

This product must be applied out-of-doors to wood intended for exterior use only. Not for interior use. Before use, thoroughly stir contents of can. For uniformity, mix all cans together before use and stir occasionally during use. Apply to clean, dry, cedar, redwood, pressure-treated wood and most other woods. Do not apply over hardboard particleboard, or wood coated with paint, creosote-based materials or latex products. It is not recommended to thin or mix with any other stains or any other Cuprinol brand products.

Continued on back

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SHERWIN WILLIAMS

CUPRINOL®

CLEAR DECK & WOOD SEAL

APPLICATION

Use a synthetic bristle brush, pad, spray or dip (siding 15-30 seconds). Backbrush after spray or dip. Apply immediately to absorbent wood to minimize cracking, splitting and warping. A sample brushout is recommended to ensure satisfaction. One coat is normally sufficient. If the first coat is rapidly absorbed, apply a second coat within 2 hours after the first coat is applied. Do not apply more that 2 coats. Do not thin. Thoroughly cover cut ends and joints. For best results apply in shade with surface temperatures between 50°F and 90°F. Do not apply if temperatures will fall below 40°F or if rain is expected within 24 hours after application. Cooler temperatures require longer drying times. Depending on wood type, temperature and humidity, this product normally dries in 5 hours, but thorough drying requires 24 hours. Maintain protection by reapplying when water begins to pool (instead of beading) on wood surface and when wood begins to gray and weather naturally. May be applied to damp, but not wet, surfaces (best applied to dry surfaces).

Note: New wood normally requires less product than old, weathered wood. This is due to older wood being more porous than newer wood.

CAUTIONS

This product must be applied out-of-doors to wood intended for exterior use only. Not for interior use.
Do not use on roofs.
Use at temperatures between 50 and 90°F.
See label for additional cautions.

- To protect wood below ground and for wood in contact with water, use Cuprinol No. 10 Green Wood Preservative.
- To protect wood above ground from decay and rot, as well as mildew, use Cuprinol Clear Wood Preservative.
- To protect wood from turning gray, use Cuprinol UV Sunblock Deck & Wood Seal or Cuprinol Clear Deck & Siding Wood Finish.

PRODUCT CATALOG

Homeowners

Designers

Architects

Industrial Coatings

Professional Contractors

HOME SITE MAP SEARCH

Back to INDEX

Key
L=Latex | **O**=Alkyd/Oil | **S**=Other/Special
Int=For Interior Use | **Ext**= Exterior Use

Code	**Product Name**	**Type**
M31/ M32	Waterborne Epoxy Block Filler	S
M43/ M44	Acrylic Epoxy Gloss Coating	S
M56	Safety & Zone Marking Alkyd	O
M58	Safety & Zone Marking Latex	L
M67	Anti-Slip Aggregate	S
M82	Rust Converter	L
M83	Oil & Grease Emulsifier	NA
M85	Concrete Pretreatment & Etch	NA

These profiles are abstracts of the complete Product Technical Data Sheets, which contain detailed product information and are available (PDF format) by clicking on the Technical Data Sheet (pdf) links. They are also available from your Benjamin Moore Representative or local authorized Benjamin Moore dealer.

Quality level descriptions, from good to best, are: Economy, Very Good, Excellent, Premium

Please note that not all Benjamin Moore products are available in

Safety & Zone Marking Latex
M58

Back to INDEX
Top of Page
MSDS
Technical Data Sheet (pdf)

Product Information
This fast dry latex coating is designed for marking traffic lanes on streets, highways, parking lots, airports, warehouses, and shopping centers. For designating parking spaces and other vehicular or foot traffic control markings. Traffic beads may be utilized with the coating to provide reflectorized marking. If beads are to be used they should be dropped into the wet paint immediately after application at a rate of 6 pounds per gallon of paint. This coating may be applied to concrete or asphalt surfaces, interior or exterior.

Technical Data	White
Generic Type	Acrylic Latex
Clean Up With	Clean Water

Recommended Uses
Coating asphalt or concrete on interior or exterior surfaces. Performs well when used for marking traffic lanes, streets & highways, parking lots, parking spaces, crosswalks, fire lanes, no parking areas, and other vehicular or foot traffic control markings. For airports, manufacturing plants, shopping centers, schools, hospitals, and warehouses.

Colors:
M58-01 White
M58-10 Yellow
M58-20 Red
M58-30 Blue
M58-80 Black

Tint Bases: None

DATA ISSUES: ATTACHMENT 2

SHER-WOOD® CAB-ACRYLIC LACQUER

SHER-W00D® CAB-Acrylic Lacquer is formulated to meet the water white and non-yellowing demands of the furniture, kitchen cabinet, and wood finishing markets. It is intended as a clear topcoat over white, "pickled" or light pastel stains where the best non-yellowing properties are required. Cellulose Acetate Butyrate (CAB)-Acrylic presents the best chemistry of lacquers for resistance to yellowing.

Advantages:

Meets the federal HAPS rule for wood products as packaged*
Water-white color
Excellent resistance to yellowing - superior to all nitrocellulose compositions
Meets KCMA specifications when applied over SHER-WOOD Vinyl Sealer T67F3
VOC under 5.6 lb/gal
Fast drying - similar to nitrocellulose lacquers
May be used directly over solid color lacquers as a "scuff coat"
Excellent film clarity and color retention
Application by conventional, airless or air assisted airless spray equipment
Excellent print resistance after overnight dry
May be used as a shading lacquer or toner by adding small quantities of Chroma Chem 844 colorants or SHER-WOOD Dye Stains

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SHERWIN WILLIAMS®

SHER-WOOD®

FINISHES FOR THE WOOD INDUSTRY

1 U.S. Gal 3.78 L

CAB ACRYLIC LACQUER
BRIGHT RUBBED EFFECT
T75 F 16 5010-37899

DANGER! FLAMMABLE – HARMFUL IF INHALED – MAY AFFECT THE BRAIN OR NERVOUS SYSTEM, CAUSING DIZZINESS, HEADACHE OR NAUSEA. IRRITATES EYES, SKIN AND RESPIRATORY TRACT. CAN BE ABSORBED THROUGH THE SKIN. Before using, carefully read CAUTIONS elsewhere on label.

0 35777 26216 0

H HEALTH	2
F FLAMMABILITY	3
R REACTIVITY	0
PERSONAL PROTECTION	☐

CAS No.	Ingredient
110-19-0	Isobutyl Acetate
78-83-1	2-Methyl-1-propanol
Unknown	Acrylic Polymer
9004-36-8	Cellulose Acetate Butyrate
64742-89-8	VM & P Naphtha
64-17-5	Ethanol
78-93-3	Methyl Ethyl Ketone
26761-40-0	Diisodecyl Phthalate
110-43-0	Methyl n-Amyl Ketone
1330-20-7	Xylene
628-63-7	Amyl Acetate

NON PHOTOCHEMICALLY REACTIVE

92

SHER-WOOD® CAB ACRYLIC LACQUER

SHER-WOOD® CAB Acrylic Lacquer is formulated to meet the most water white color and non-yellowing requirements of the furniture, kitchen cabinet and wood finishing markets. It is intended as a clear topcoat over white, "pickled" or light pastel stains where the best water white and non-yellowing properties are required. Cellulose Acetate Butyrate (CAB)-Acrylic represents the best chemistry of lacquers for resistance to yellowing.

SUBSTRATE

Wood surfaces must be clean, dry, finish sanded and dust free to insure optimum performance properties. Apply over stained, sealed and sanded substrate. SHER-WOOD Wiping Stains – S64-Series – are recommended.

SHER-WOOD Vinyl Sealer: 24% Solids T67F3 is recommended as the sealer to meet KCMA performance properties. Do not use a nitrocellulose sealer or as a self seal system.

APPLICATION

SHER-WOOD CAB Acrylic Lacquer may be applied without reduction using conventional, airless or air assisted airless spray equipment. If necessary or desired for better application, you may reduce 5-10% with OPEX® Lacquer Thinner R7 K 120. Spray a full wet coat of CAB Acrylic Lacquer and allow 30-60 minutes drying. For more depth and better appearance, apply a second topcoat.

Recommended Film Thickness: (per coat)

Wet: 5.0 - 6.0 mils **Dry:** 0.7 - 0.9 mils

DRYING

Air Drying:	77°F and 50% R.H.
To Touch:	10 minutes
To Handle:	15-20 minutes
To Sand:	30-60 minutes
To Recoat:	30-60 minutes
To Pack:	Allow overnight drying
Force Dry:	10-20 minutes at 110-140°F

Use OPEX® Lacquer Thinner R7 K 120 or equivalent for cleanup.
Refer to Product Data Sheet CC-F23 for additional data.

FOR INTERIOR USE ONLY

5 93

The Sherwin-Williams Company
Cleveland, Ohio 44115

CAUTIONS

N01524(P) (7-97)

Contents are **FLAMMABLE.** Vapors may cause flash fires. Keep away from heat, sparks, and open flame. During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

SEE CONTENTS STATEMENT ELSEWHERE ON LABEL

VAPOR HARMFUL. Use only with adequate ventilation. Wear an appropriate properly fitted vapor/particulate respirator (NIOSH/MSHA approved) during and after application, unless air monitoring demonstrates vapor/mist levels are below applicable limits. Follow respirator manufacturer's directions for respirator use.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID

If **INHALED:**	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on **SKIN:**	Wash affected area thoroughly with soap and water. Remove contaminated clothing. Launder before re-use.
If in **EYES:**	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If **SWALLOWED:**	Get medical attention immediately.

SPILL AND WASTE

Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.

DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY – KEEP OUT OF THE REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY – SEE MATERIAL SAFETY DATA SHEET

DATA ISSUES: ATTACHMENT 3

SHER-WOOD® WHITE CAB-ACRYLIC LACQUER

SHER-WOOD® White CAB-Acrylic Lacquers are designed for interior wood finishing where light stable, non-yellowing whites and pastels are required. These white lacquers can be used for finishing kitchen cabinetry, furniture, and other interior woodworking. Cellulose Acetate Butyrate (CAB) Acrylic represents the best chemistry of lacquers for resistance to yellowing.

Advantages:

- Excellent resistance to yellowing - superior to all nitrocellulose compositions
- Meets KCMA specifications when applied over Sher-Wood Vinyl Sealers, T67F3 and T67F5, Sher-Wood White Vinyl Sealer, P63W2 or Sher-Wood Vinyl Primer Surfacer, P65W4
- Meets the Federal HAPS rule for wood finishes as packaged*
- VOC under 5.5 lb/gal
- Fast drying - similar to nitrocellulose lacquers
- Application by conventional, airless, air-assisted airless, or HVLP spray equipment
- Excellent print resistance after overnight dry
- Can be tinted with ChromaChem® 844 colorants up to 4 oz/gal to make a variety of off-white and pastel colors
- May be blended with Sher-Wood Clear CAB-Acrylic Lacquer

DATA ISSUES: ATTACHMENT 4

SHER-WOOD® KEM AQUA® LACQUER

SHER-WOOD® KEM AQUA® Lacquer is a high quality, water reducible, acrylic latex, clear system for finishing furniture, cabinets and a wide variety of wood and novelty items without the hazards associated with nitrocellulose lacquer and highly flammable solvents. It offers improved clarity and ease of handling over other latex coatings and meets all current EPA regulations for volatile organic compounds emissions for wood finishing.

Advantages:

Meets KCMA specifications
Very low VOC under 2.0 lb/gal less water
Very low volatile organic emissions - less than 1.0 lb/gal
Excellent film clarity - like solvent based nitrocellulose lacquers
Meets the Federal HAPS rule for Wood Finishes as packaged*
Complete water system that handles and performs much like a lacquer
Excellent mar resistance
Better resistance to microfoaming than other latex clears
Minimizes tannin bleed discoloration when used with Sher-Wood Kem Aqua Lacquer Sanding
Sealer T65F520
Dries to handle and sand in 30 minutes at room temperature
Very good hardness, block resistance, and print resistance
Offers greater safety to the user because it does not contain the volatile flammable organic solvents typical of lacquers
Contains water. Reduced with water
Excellent resistance to blushing
No flash point

*National Standards for Hazardous Air Pollutants (HAPS) Emissions for Wood Furniture Manufacturing Operations, CFR 40, Part 63, Subpart JJ

SHER-WOOD®
KEM AQUA® LACQUER

SHER-WOOD® KEM AQUA Lacquer is a high quality water reducible acrylic latex clear system for finishing furniture, cabinets and a wide variety of wood and novelty items without the hazards associated with nitrocellulose lacquer and highly flammable solvents. It offers improved clarity and ease of handling over other latex coatings and meets all current regulations for EPA volatile organic compounds emissions for wood finishing. It is fast drying, water white, low odor, has no flash point and is HAPS complying making it a very user friendly product

SUBSTRATES

Wood surface must be clean, dry, finish sanded and dust free to insure optimum adhesion and coating performances properties.

APPLICATION

SHER-WOOD KEM AQUA Lacquer may be applied by conventional, airless, air assisted or HVLP spray or by dipping. Apply without reduction or reduce up to 5% with water for better control.

Recommended Film Thickness (per coat):

Wet: 3.0-4.0 mils — Dry: 0.8-1.1 mils

DRYING

Air Dry:	77°F and 50% RH	
	To Touch	15 minutes
	To Handle	20-30 minutes
	To Recoat	30 minutes
	To Sand	30 minutes
	To Pack	overnight
	To Rub	4 hours minimum
Force Dry:	10-20 minutes @ 120°F or equivalent	

KEM AQUA Lacquer dries primarily by water evaporation. Best drying occurs at relative humidity of 50% or lower and temperatures of 77°F (25°C) or higher. Good air movement is essential for complete dry.

TANNIN BLEED: When finishing Redwood, Red or White Oak, and Cedar Wood with water based finishes, tannins may be extracted from the wood by the water and cause yellowing, staining or discoloration of the stain, sealer and/or topcoat. This tannin bleed is most evident with white or pickled stains and clear topcoats. Users are urged to thoroughly test the system under shop conditions. If tannin bleed is evident, seal with SHER-WOOD Vinyl Sealer T67F3 or T67F5.

Clean mixing equipment with soap and water, then dry thoroughly. Flush spray equipment completely with water followed by flushing with alcohol to remove water residue and to prevent rusting.

When film has aged or when stripping for rework, use a blend of 75 parts Acetone R6K9 and 25 parts household ammonia (or equivalent). KEM AQUA Lacquer must be stored inside and protected from freezing. The use of stainless steel or plastic containers, piping and other components is recommended to prevent rusting.

Refer to product data sheet CC-F41 for additional data.

For Interior Use Only

4/96

PROTECT FROM FREEZING

The Sherwin Williams Company
Cleveland, Ohio 44115

SHERWIN WILLIAMS®

SHER-WOOD

FINISHES FOR THE WOOD INDUSTRY

KEM-AQUA®
LACQUER
BRIGHT RUBBED EFFECT
T75 F 526
5010-55388

5 U.S. Gal — 18.92 L

P★18

CAUTION
SEE CONTENTS STATEMENT EL
Use only with adequate ventilati
sure, open windows and doors
ensure fresh air during applicat
experience eye watering, heac
increase fresh air, or wear re
(NIOSH/MSHA TC23C or equivalen
Avoid contact with eyes and sk
using. Keep container closed wh
transfer contents to other containe
FIRST AID: In case of eye contact,
large amounts of water. Get medic
persists. If swallowed, get medical
SPILL AND WA
Remove all sources of ignition. Ve
inert absorbent. Incinerate in ap
incinerate closed container. Dispos
Federal, State, and Local regulation
DO NOT TAKE INTE
KEEP OUT OF THE REACH
FOR INDUSTRIAL U
SEE MATERIAL SAFETY

CAS No.	Ingredie
7732-18-5	Wat
Unknown	Acrylic Po
111-76-2	2 Butoxyethan
34590-94-8	2 Methoxymethylethoxypropa
Unknown	Ethylhexyl Glycol Ethe

NON-PHOTOCHEMICALLY REACTIVE

SHERWIN WILLIAMS®

SHER-WOOD

FINISHES FOR THE WOOD INDUSTRY

KEM-AQUA®
LACQUER
BRIGHT RUBBED EFFECT

T75 F 526
5010-55388

5 U.S. Gal

18.92 L

CAUTIONS

0B19(X) (7 97)

SEE CONTENTS STATEMENT ELSEWHERE ON LABEL

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.

SPILL AND WASTE

Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.

DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY
SEE MATERIAL SAFETY DATA SHEET

CAS No.	Ingredient
7732 18 5	Water
Unknown	Acrylic Polymer
111 76 2	2 Butoxyethanol
34590 94 8	2 Methoxymethylethoxypropanol
Unknown	Ethylhexyl Glycol Ethers

NON PHOTOCHEMICALLY REACTIVE

KEEP FROM
Freezing

H HEALTH	2
F FLAMMABILITY	0
R REACTIVITY	0
PERSONAL PROTECTION	☐

0 35777 35200 7

P*18

DATA ISSUES: ATTACHMENT 5

POLANE® H. S. PLUS POLYURETHANE ENAMEL

POLANE® HS Plus Polyurethane Enamel is a two component coating providing high gloss, excellent exterior durability and resistance properties along with high volume solids and 2.8 VOC compliance. The single pigment colors are designed for intermixing to achieve great versatility in color matching capability.

Advantages:

Under 2.8 VOC with Polane HS Plus Catalyst V66V55
Excellent exterior color and gloss retention with V66V55 catalyst
Excellent exterior physical and chemical performance properties
Excellent appearance over many types of metal and plastic substrates
Ideal coating for machine tool industry with resistance to most lubricants and cutting oils
High solids - high spreading rate
Air dry or force dry curing
Full range of colors may be custom blended
Excellent hardness and impact resistance
Excellent mar and abrasion resistance
Apply by conventional, airless, air assisted airless, HVLP or electrostatic spray
Much faster drying times achieved with the use of infratherm type ovens
For interior use, Polane HS Plus may be catalyzed 2:1 with Polane Plus Catalyst V66V44 and reduced 24% MAK
Free of lead and chromate hazards

POLANE® HS PLUS POLYURETHANE ENAMEL

POLANE® HS Plus Polyurethane Enamel is a two component polyurethane coating that offers high volume solids and 2.8 VOC compliance. It offers high gloss, excellent hardness, adhesion and chemical resistance and excellent color and gloss retention for exterior applications using POLANE® HS Plus Catalyst, V66 V 55.

SUBSTRATES

Iron and Steel: Surface must be free of dirt, oils, grease, fingerprints, rust, oxidation products and other foreign matters to obtain optimum adhesion and coating performance properties. Chemical treatment or conversion coatings (i.e. iron or zinc phosphate) give the best adhesion and performance properties.

Untreated Metal: Prime with POLANE Plus Primer E65 A 71 or 2.8 VOC Catalyzed Epoxy Primer. For structural steel and heavy duty industrial maintenance applications, sand blast and prime with 2.8 VOC Catalyzed Epoxy Primer at 4-5 mils dry film thickness.

Cast Iron: Fill with POLANE 2.8 Plus Spray Fil D61 H 75 and sand. Seal with POLANE Plus Primer E65 A 71.

Aluminum and Galvanized Iron (Untreated): Prime with Industrial Wash Primer, P60 G 2, or KEM AQUA® Wash Primer followed by POLANE Plus Primer E65 A 71 or 2.8 VOC Catalyzed Epoxy Primer.

Plastic: Coating must be evaluated on customer substrate. Filler or barrier coat may be required.

Wood: For interior use only. Surface must be dry, sanded, and dust free. Seal with full coat of POLANE® 2.8 Plus Spray Fil D61 H 75.

APPLICATION

POLANE HS Plus Coatings must be catalyzed, by volume, as follows:

3 parts POLANE HS Plus
1 part POLANE HS Plus Catalyst, V66 V 55
48 parts (12%) MAK R6 K 30 maximum to maintain 2.8 VOC

For faster air drying, addition of up to one ounce per gallon of accelerator V66 VB 11 per gallon of uncatalyzed POLANE is recommended.

Working potlife is 3 hours at room temperature without accelerator or about 1 hour with 1 oz/gallon of accelerator. Higher temperature will shorten working potlife.

NOTE: For interior applications, POLANE HS Plus may be catalyzed 2:1 with POLANE Plus Catalyst V66 V 44 and reduced 24% with MAK Reducer, R6 K 30 for 3.5 VOC. Working potlife is 1 hour.

Recommended Film Thickness:

Wet: 2.0-2.5 mils Dry: 1.25-1.50 mils

POLANE HS Plus may be applied by conventional, air assisted airless, HVLP, airless or electrostatic spray methods.

DRYING

Catalyzed 3:1 with V66 V 55 at 2.0-2.5 mils wet (1.25-1.50 mils dry film).
Air Drying: (77°F & 50% RH)

	Unaccelerated	with 1 oz./gallon Accelerator V66 VB 11
To Touch	1-1½ hours	½-1 hour
Tack Free	8 hours	1-2 hours
To Handle	10-12 hours	2-3 hours
To Recoat	5-6 hours	1-1½ hours
Working Pot Life	3 hours	1 hour

Force Dry: 30 minutes at 140-180°F

Use POLANE Reducer R7 K 84, MEK, MAK or MIBK for cleanup. Refer to Product Data Sheet CC-D20 for additional data.

Safety Precautions: This product must be mixed with a POLANE Catalyst containing isocyanates. People who have chronic (long term) lung or breathing problems or have had a reaction to isocyanates must not be in the area where this product is being applied. In spray application where overspray is not totally controlled, air-supplied respirators are recommended to prevent exposure. Where air-supplied respirators are not available, a chemical cartridge/particulate combination respirator, recommended by the respirator manufacturer for protection against isocyanate spray paints, must be used.

Before using this product, carefully read the instructions and precautions on the catalyst label.

4-96

The Sherwin-Williams Company
Cleveland, Ohio 44115

Chemical Coatings

POLANE® HS Plus Polyurethane

WHITE 520-9465

F63 W 66

5 U.S. Gal / 18.92 L

DANGER! FLAMMABLE! HARMFUL IF INHALED - MAY AFFECT THE BRAIN OR NERVOUS SYSTEM, CAUSING DIZZINESS, HEADACHE OR NAUSEA. IRRITATES EYES, SKIN AND RESPIRATORY TRACT.
Before using, carefully read CAUTIONS elsewhere on label.

CAUTIONS

Contents are **FLAMMABLE**. Vapors may cau from heat, sparks and open flame. During u gone: Keep area ventilated - Do not smoke - lights, and heaters - Turn off stoves, electric any other sources of ignition.

SEE CONTENTS STATEMENT ELSEW

VAPOR HARMFUL. Use only with adequate must be used with an appropriate catalyst. Fol ment and instructions on the catalyst.

Avoid contact with eyes and skin. Wash container closed when not in use. Do not t containers for storage.

FIRST AID

If INHALED: If affected, remove from ex Keep warm and quiet.
If on **SKIN**: Wash affected area thorou Remove contaminated cloth
If in **EYES**: Flush eyes with large amoun Get medical attention.
If **SWALLOWED**: Get medical attention immed

SPILL AND WASTE

Remove all sources of ignition. Ventilate absorbent. Incinerate in approved facility. [container. Dispose of in accordance with Feder tion regarding pollution.

DELAYED EFFECTS FROM LONG TERM OV solvents which can cause permanent brain and Intentional misuse by deliberately concentrating can be harmful or fatal. This product must be nents before use. Before opening the packag **WARNING LABELS ON ALL COMPONENTS.** contains chemicals known to the State of Calif birth defects or other reproductive harm.

DO NOT TAKE INTERNA
KEEP OUT OF THE REACH OF
FOR INDUSTRIAL USE (
SEE MATERIAL SAFETY DAT

CAS No	Ingre
13463-67-7	Titanium D
110-43-0	Methyl n Amyl K
68918-91-2	[illegible]
Unknown	[illegible]
108-65-6	[illegible]

E★19 NON-PHOTOCHEMICALLY REACTIV

SHERWIN WILLIAMS®

Chemical Coatings

POLANE® HS Plus Polyurethane

WHITE 520-9465

F63 W 66

5 U.S. Gal / 18.92 L

DANGER! FLAMMABLE! HARMFUL IF INHALED - MAY AFFECT THE BRAIN OR NERVOUS SYSTEM, CAUSING DIZZINESS, HEADACHE OR NAUSEA. IRRITATES EYES, SKIN AND RESPIRATORY TRACT.
Before using, carefully read CAUTIONS elsewhere on label.

CAUTIONS

K01810(P) (7-97)

Contents are **FLAMMABLE** Vapors may cause flash fires. Keep away from heat, sparks and open flame. During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

SEE CONTENTS STATEMENT ELSEWHERE ON LABEL

VAPOR HARMFUL. Use only with adequate ventilation. This product must be used with an appropriate catalyst. Follow the respirator requirement and instructions on the catalyst.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID

If **INHALED**:	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on **SKIN**	Wash affected area thoroughly with soap and water. Remove contaminated clothing. Launder before re-use.
If in **EYES**:	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If **SWALLOWED**	Get medical attention immediately.

SPILL AND WASTE

Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.

DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. This product must be mixed with other components before use. Before opening the packages, **READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.** WARNING. This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY
SEE MATERIAL SAFETY DATA SHEET

CAS No	Ingredient
13463-67-7	Titanium Dioxide
110-43-0	Methyl n-Amyl Ketone
[illegible]	[illegible] Vegetable Oil
Unknown	Acrylic Polymer
108-88-3	Toluene

E★19 **NON-PHOTOCHEMICALLY REACTIVE**

0 35777 24680 1

H HEALTH	2
F FLAMMABILITY	3
R REACTIVITY	0
PERSONAL PROTECTION	

The Sherwin-Williams Company
Environmental, Health & Regulatory Services
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115-1075
Facsimile: (216) 566-2730

Document by E-mail to jnyarady@arb.ca.gov and
Document with Attachments by FEDERAL EXPRESS NO. 8187 1626 1466

April 7, 2000

Mr. Jim Nyarady
Manager, Strategy Evaluation Section
Stationary Source Division
California Air Resources Board
2020 L. Street
P. O. Box 2815
Sacramento, CA 95812

Dear Mr. Nyarady,

The Sherwin-Williams Company is pleased to have this opportunity to comment on the Draft Program Environmental Impact Report (EIR) for the proposed Suggested Control Measure for Architectural Coatings (SCM). The Sherwin-Williams Company is one of the largest coating manufacturers in the world, with 1999 annual sales of over five billion dollars. We maintain manufacturing facilities throughout the country, including several within the State of California. We maintain company-owned and operated Stores throughout the country. These are the exclusive distributors / retailers for the Sherwin-Williams brand. In addition to this distribution, our products, under a variety of additional brand names, are distributed through mass merchandisers, do-it-yourself outlets, hardware stores, and by independent distributors. Our product lines include some of the best known brands in the marketplace, including Minwax®, Thompsons®, Pratt & Lambert®, Martin-Senour®, Dutch Boy®, Krylon®, Rust Tough®, Cuprinol®, Red Devil®, and Formby's®. In the architectural and industrial maintenance product areas these coatings are used for their decorative and protective properties.

9b-1

AVERAGING

Although in earlier discussions the ARB seemed committed to developing an Averaging Provision for the SCM, the EIR states that the ARB will not be including such a Provision with the current proposal. Although the ARB formed an averaging committee to develop a useful averaging program, only two meetings were held (one of which was originally scheduled as a Working Committee meeting for the South Coast Air Quality Management District (SCAQMD). While the EIR notes that there are difficulties in developing such a program, the ARB has not held the additional meetings needed to discuss and resolve these difficulties. We note that without such a provision, the proposed Suggested Control Measure is more restrictive than the rules adopted by the SCAQMD – the only District in the country ranked as Severe for ozone nonattainment by the U. S. Environmental Protection Agency.

We believe the ARB should postpone the Hearing on the proposed SCM until an Averaging Program can be developed.

ADMINISTRATIVE ISSUES

Rust Preventative Coatings

9b-2 The ARB proposed SCM precludes the industrial use of rust preventative coatings, even when the VOC content of the rust preventative coating meets the industrial maintenance limit. This does not make sense since if the VOC content meets the industrial maintenance limit, no additional emissions would result in such usage. Section 3.7 should be changed to the wording found in the 12/1/99 proposal:

> Rust Preventative Coatings: Effective January 1, 2004, no person shall apply or solicit the application of any rust preventative coating for industrial use, unless such a rust preventative coating complies with the industrial maintenance coatings VOC limit.

Sell Through of Coatings

9b-3 Section 3.3 needs to have a sentence added to allow the use of coatings manufactured prior to the effective date of the rule. Such use should be for an indefinite period of time, since if the product can not legally be used, disposal would be needed. In the State of California even latex paints are classified as hazardous wastes. Thus, we recommend that for the full life of the product, it be allowed used up rather than be required to be sent for hazardous waste disposal. We recommend the following sentence be added to Section 3.3:

> A coating manufactured prior to the effective date specified for that coating in Table 1 may be used and applied.

SPECIFIC CATEGORY AND LIMIT CONCERNS

Floor Coatings

9b-4 Appendix D provides a description of the floor coating category as, "a variety of high performance clear or opaque coatings." However, the definition for the category included in the 2/11/00 proposal states, "An opaque coating ...." We consider it to be critically important to only include opaque coatings in this category. The alternative would include floor varnishes, stains, etc. which have different performance and VOC requirements and which are already covered under other categories.

Appendix D states that there are only limited residential applications in the floor coating category and that the majority of the usage is in commercial and industrial applications. As such, we believe our proposal for this category to be divided into two sub-categories should be considered an acceptable alternative that will provide the needed performance and safety requirements for the residential user, as well as the professional user in more industrial sites.

9b-5

The Sherwin-Williams Company considers multi-component systems to be inappropriate and too hazardous for nonprofessional application in residential settings. Most of the paint manufacturers agree that multi-component systems are not appropriate for residential use. An example of the hazards of such products is shown on the attached Material Safety Data Sheet (MSDS) (Attachment 1) and the Product Data Sheet (Attachment 2) for the Sherwin-Williams Armor Seal 650 SL/RC product line, which is included in Appendix E, Table E-9 on Floor Coatings. This product is part of our Industrial Maintenance product line. The MSDS for this product warns that any of the hardeners may cause **burns** on contact with skin or eyes. For this reason, this is not a product which we would recommend for nonprofessional users. The Product Data Sheet recommends uses for the product as "clean rooms, aircraft hangars, laboratories, workshops and light assembly areas" and only for concrete or steel surfaces. In no way does the Product Data Sheet indicate a residential use.

5 We would like to contrast this information to our Acrylic Latex Floor Enamel which is intended for use by non-professionals in residential setting. The Product Data Sheet (Attachment 3) and MSDS (Attachment 4) for this product are attached and show no "noteworthy" hazards. It is obvious from the data sheet that this product is recommended for residential uses, such as floors, steps, concrete, wood, and steel, and that the product can easily be applied in a safe manner.

9b-6 Appendix E lists only two products that are not multi-component coatings and which, based on the delineations used by most of the industry, might be considered appropriate for residential use. Of these, the Benjamin Moore product is not a floor coating (see our letter of 3/24/00). This means that there is only one product included in the EIR which is appropriate for non-professional use in residential settings being included in the evaluation of the Floor Coating category and which could comply with the proposed limit.

An evaluation of the product information obtained by ARB on the remaining products shows the following:

> Advance Polymer Systems Guardline Concrete Corrosion Resistant (Siloxirane) system is a multi-component system only recommended for concrete. The shortness of the pot life makes it less practical than average for use by a non-professional user.
>
> The Ameron PSX® 700 product data sheet included in the response to the FOIA request provides typical uses of steel, concrete walls and floors, and inorganic zinc silicate coated surfaces on bridges, marine decks and boottops, tanks, piping, power plants, pulp and paper facilities, rail cars, vehicles (e.g. buses and trucks) – it does not indicate any residential type use. The data sheet for this multi-component siloxane specifically notes "For professional use only" and not recommended for residential use. The MSDS(Attachment 5) recommends the following protective clothing and equipment: "...wear resistant coverall, gloves, and show coverings to prevent skin contact. Wear solvent resistant glasses with splash guards or face shield to protect eyes from splash, spatter, an/or spray mist..." None of this personal protection equipment is typically owned or used by residential users.
>
> Air Products' Adura 50 Polyol and Adura 100 Polyol are Industrial Coating Resins which, when combined with other ingredients can form one part of a multi-component coating system. The other component needed to form the coating film must be an isocyanate. A typical recommended isocyanate is Bayer's Desmodur N-3300. The MSDS for this product is included (Attachment 6) and clearly shows that this material is totally inappropriate for use by untrained non-professional users. Air monitoring is recommended, as is medical surveillance of all persons handling or coming into contact with this material. Note that the Employee Protection section of the MSDS is 4 pages long, clearly indicative of the care that must be utilized in handling an isocyanate compound.
>
> The three Coatings Resource Corp. products listed are all shown as Industrial Coatings. On each of the data sheets the following statement is made, clearly indicating that these products are not for use by non-professionals: "FOR INDUSTRIAL USE BY PROFESSIONAL APPLICATORS ONLY. NOT INTENDED FOR SALE TO THE GENERAL PUBLIC."

These are just a few examples of the fact that most, if not all, of the coating manufacturers consider multi-component coatings for use only by professionals. Depending on the specific chemistry of the products, most coating manufacturers will not recommend under any circumstances specific chemistries for use in residential settings even by professional users.

At the Workshop on 3/16/00, Mr. Greg Allen of ARB staff mentioned that he had found additional floor coatings that would meet the proposed VOC content limit of 100 g/l and which would be appropriate for residential use. We have received information from Mr. Allen on twelve coatings, which are presumably the products he referred to.

9b-7 The following table outlines the information provided and our concerns with using such information to support a 100 g/l VOC content limit for all floor coatings:

Table 1: Data on Additional Floor Coatings*

Product	Concern
SealKrete Skid-Proof EZ Coat (Attachment 7)	Neutral, not opaque. As such, does not qualify as floor coating Recommends mixing (by mechanical shaker) of a paint to add color – shakers are equipment not found in most residential settings. Recommends etching with muratic acid, followed by a pH determination – not activities typical of residential users Requires a minimum of 2 coats, after application of a sealer
SealKrete Proformance Skid-Proof	Neutral, not opaque. As such, does not qualify as floor coating Application is only by trowel, spray hopper or larger textured sprayer – equipment that is not familiar to nonprofessional users. Recommends mixing with a blade mixer of a paint to add color – equipment not found in most residential settings. Only covers 150 sq ft per 10 lb pail (probably 10 lb pail is about 1 gallon)
9b-7 SealKrete Commercial Floor Sealer HS	This is described as a clear sealer and does not meet the definition for a floor coating.
SnowProof Systems Safe-T-Prime	This is described as a rubber primer and does not meet the definition for a floor coating.
SnowProof Systems Safe-T-Kote	Recommended for roofs and thus does not meet the definitional limitations of a floor coating The MSDS states "An eyewash and safety shower should be nearby and ready for use." Neither of these are available in residential settings.
Jasco -	Special handwritten note states there is a new product "Stop Slip Floor Coating" with a low VOC. However, no information on this product appears available. Rule making should not be based on such flimsy information.
Sherwin-Williams Armorseal 1000 HS (Attachment 8)	This product is an industrial maintenance and marine coating. The label states, "For hulls, decks, tanks and superstructures of marine vessels. For masonry and steel structures, storage tanks, pipes, machinery and equipment, concrete floors, etc., in marine and industrial environments." – these are not floors. The label states, "Not for Residential Use" and "For Professional Use Only."
Litex 2-part Epoxy Waterbased Floor Ctg	Two-component epoxy – not appropriate for non-professional users. Very little information was provided, including no VOC information, no MSDS.
Litex 2-part Epoxy Waterbased Rubber Floor Ctg	Two-component epoxy – not appropriate for non-professional users. Very little information was provided, including no VOC information, no MSDS Seems to be recommended for concrete surfaces, not for general purpose, wood porches, etc.
Litex 2-part Epoxy Waterbased High Gloss Clear	This is a clear coating, and thus does not meet definition of floor coating. Very little information was provided, including no VOC information, no MSDS.
Litex 2-part Epoxy Waterbased Concrete Stain	As a stain, this is not opaque and thus not a floor coating. Very little information was provided, including no VOC information, no MSDS.
Epoxi-Tech Epoxy Shield	This claims to be a garage floor coating, nothing else. Very little information was provided, including no VOC information, no MSDS.

*From data sheets and other information supplied by Greg Allen, ARB staff, on additional Floor Coatings to meet the proposed VOC limit.

9b-8 Thus, with all of the data accumulated by the ARB, only one coating product which would be appropriate for use by non-professionals in residential settings was found with a VOC content to comply with the proposed 100 g/l limit. This is an inadequate basis for establishing a limit which will essentially require residential users to be exposed to hazardous chemicals.

9b-9 The Sherwin-Williams Company recommends the Floor Coating category be divided into 2 categories: one for industrial and commercial use and one for residential use, with VOC contents of 100 and 250 g/l respectively, with the following definitions:

> *Floor Coating- Multi-Component: A floor coating requiring the addition of a separate reactive resin, commonly known as a catalyst or hardener, before application to form an acceptable dry film.*
>
> *Floor Coating – Single Component: A floor coating that is ready for application as it comes out of its container to form an acceptable dry film. Thinner, that may be necessary to reduce the viscosity, and skid preventative additives are not considered a component.*

Primers, Sealers, And Undercoaters

Exterior Wood Primers, Sealer, and Undercoaters

9b-10 As discussed during the 3/16/00 Workshop and now confirmed, the primers and undercoaters recommended by The Sherwin-Williams Company for use on wood and composition board under all exterior latex coatings are consistently solvent borne with a VOC content of 350 g/l. We have reviewed all of the Sherwin-Williams product data sheets and have found only one product line where a latex primer is recommended: the LowTemp 35™ product line recommends the LowTemp 35™ Exterior Latex Primer for application over wood and composition board. However, since this is a unique system, we do not generally recommend this primer for use on wood and composition board under our other exterior latex coatings. Product Data Sheets for all of the exterior latex systems are enclosed. (Attachments 9-22)

We want to stress that the concerns with wood and composition board are not limited to stains bleeding through from the substrate. While that is a significant problem with waterborne coatings on certain woods (e.g. redwood, cedar, etc.), it is less of a problem with composition board. However, composition board frequently has a wax-type of material bleeding out. Unless sealed by a solvent borne primer, this wax will appear as unsightly dark patches on the finish. We recommend the following category be added with a 350 g/l limit:

> *Exterior wood primer, sealer, and undercoater: A primer, sealer, or undercoater formulated and recommended for use exclusively on exterior wood.*

Interior Wood Sealers

9b-11 The lowering of the VOC limit for sealers and quick dry sealers to 200g/l will force these mineral spirits based products to either raise solids or use alternative exempt solvents. The use of acetone is unacceptable due to the highly flammable nature of this solvent. The use of Oxol 100 is prohibitively expensive. (Even if t-butyl acetate is approved an exempt solvent, its usefulness in consumer coatings will be severely restricted due to its offensive odor.) The increase of solids is not feasible due to the significantly higher brush drag, thicker films, and longer dry-time which would result. In addition, cost would be increased significantly (approximately 100%) while performance would become unacceptable. If it were possible to formulate such a solventborne coating, the increase in film thickness would cause a corresponding decrease in coverage and result in no reduction in VOC emissions.

Compliance with the proposed limit of 200 g/l would force solvent borne sealers to become cost prohibitive, less efficacious, or potentially dangerous, and would effectively ban all performing products in this category.

9b-11 The only remaining alternative to solvent borne interior wood sealers would be water borne sealers. While presently on the market, these products are less efficacious for three important reasons.

1. The first is the negative impact waterborne sealers have on grain raise. When water is applied to bare wood surfaces, wood fibers swell and create a rough feel and appearance. Any steps taken to alleviate this effect such as sanding will increase the cost job. In addition, the harm to the wood is not eliminated by sanding of the surface.

2. The second reason is the impact of panelization. In areas where fluctuations of humidity cause the expansion and contraction of wood (such as, flooring) - even after sealing and topcoating - water borne sealers can cause the wood boards to become glued together. As the wood naturally expands and contracts (with humidity and temperature variations), large cracks will appear in the flooring as a result of being glued. Solvent borne sealers do not panelize wood (flooring).

3. The final reason is waterborne sealers are more expensive than solvent borne sealers.

The remedial action required after panelization of a floor is the complete replacement of the floor. This is an enormous expense. In addition to the expense of the new floor, removal of all objects would be needed to prevent dust accumulation in crevices: all surfaces, all furniture, all appliances, including clothing, pictures, personal belongings, light fixtures, appliances, window treatments, etc. - to new building emptiness would be needed. This "inconvenience" would be extremely costly.

> *Interior Wood Sealer: A coating formulated and recommended for the application to interior wood surfaces to prevent absorption by the substrate of stains: to prevent harm to the wood; to prevent staining of the wood by outside agents; to prevent dirt from getting into the wood; to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by material in the substrate.*

<u>Stains</u>

9b-12 The current CARB definition excludes concrete stains, by defining stains as wood coatings. This needs to be changed by deleting the word "wood." No previous rule has ever limited the stain category to coatings for wood and there is no reason why this restriction should be placed on this category. We offer such a concrete stain line in our H&C® product line.

We recommend the following definition:

> *Stain:* *An opaque clear, or semitransparent coating formulated to change the color of a surface but not conceal the grain pattern or texture, including lacquer stains.*

9b-13 ***Interior Wood Stains***
Although Appendix D of the EIR states that Sherwin-Williams, Performance Coatings, FSM Corporation, PPA Technologies, and Sierra Performance Coatings have stains available with VOC contents less than the proposed 250 g/l, products from none of these companies are listed in Table E-27 of Appendix E. Appendix D also states that PPA Technologies, Fuhr Research Laboratories, and Sierra Performance Coatings have interior wood stains which comply with the proposed 250 g/l limit. However, no products from these companies are shown inTable E-27. In addition, the documents received in response to the FOIA request included no product literature for any semi-transparent complying stains for interior wood. The only semi-transparent stain product recommended for interior wood was the Deft Stain, which is for both interior and exterior use, but for which no VOC information was received. We believe such vague representations are an inadequate basis for a rule.

9b-14 The lowering of the limit for stains to 250 g/l is an effective ban of solvent borne stains. The same arguments against the use of exempt solvents and of increased solids discussed for interior wood sealers apply to these stains: acetone too highly flammable, Oxol 100 is prohibitively expensive, and t-butyl acetate (if exempted) has an unacceptable odor.

9b-15 Alternative water borne interior wood stains pose several problems in addition to those discussed for water wood sealers, when compared to the solvent borne interior semitransparent wood stains they are meant to replace. While the effect of grain raising caused by water borne stains is the same as for water borne sealers, sanding is not a viable option for stains. This is due to the potential removal of color, which will be caused by sanding. To avoid this color removal, sanding must occur after sealing or subsequent topcoating (with varnish or lacquer). This can cause entrapment of microfoam in the middle coats. This microfoam can not be removed when the raised grain is finally sanded.

Lapping is another problem attributed to water borne interior wood stains. Larger areas such as floors are prone to lap marks caused by the fast drying of such stains and subsequent overlapping of the stain during application. The only remedy for lap marks is a full re-sanding of the floor. As discussed above, this is expensive and distressing since it reduces the long term service life of the wood floor (sanding the floor removes a layer of the wood; a floor can only be sanded about three or four times before there is not enough wood left to avoid nails and to maintain its integrity. Thus, the full replacement expense of the floor can be divided by 3 or 4 to determine the cost of removing a wood layer by sanding – in addition to the direct costs of the sanding and coating re-applications.)

Even water-borne stains include the use of VOC solvents to extend dry times. Reducing the VOC limit to 250g/l would cause water borne stain formulas to dry even faster, enhancing the potential for lapping problems. The longer dry time provided by currently compliant oil based stains prevent lap marks from forming.

9b-16 We recommend the limit for interior wood stains be maintained at 350 g/l.

> ***Interior Semi-Transparent Stain:*** *A coating formulated for interior use only that produces a dry film with minimal coloring and that does not completely conceal the substrate or its natural texture or grain pattern.*

9b-17 **<u>Industrial Maintenance Tank Lining and Pipe Coatings</u>**
While many performance requirements included in the Industrial Maintenance category may be satisfied at the 250 g/l level, the one area of concern is the tank lining and pipe coating group of

products. These need a higher limit. This category would replace the "chemical storage tank coating" category that was added to SCAQMD Rule 1113.

We recommend the following definition:

9b-17 *Tank Lining and Pipe Coating: An industrial maintenance coating formulated and recommended for application to the interior surfaces of storage tanks and reservoirs and associated piping exposed to immersion in water, wastewater, organic solvents and chemical solutions (aqueous and non aqueous solutions).*

If additional information is needed, please feel free to contact me by telephone at (216) 566-2630, by facsimile at (216) 263-8635, or by electronic mail at mkharding@sherwin.com.

Sincerely,

Madelyn K Harding

Madelyn K. Harding Administrator,
Product Compliance & Registrations

G:\VOCREGS\C A R B\A I M Model Rule\SW Comments\Draft Env Impact Rpt comments.doc

ATTACHMENT 1 page 1

— Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number	(216) 566-2917
Information telephone number	(216) 566-2902
Date of preparation	December 23, 1998

ARMORSEAL™ 650SL 100% Solids, Self-Leveling Epoxy AS-650

CAS No.	— Section 2 — Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	B58 VQ650 Clear	B60 VQ650 Hardener for Clear	B58 WQ651 White	B60 VQ651 Hardener for White	B58 AQ655 Haze Gray	B58 AQ656 Deck Gray	B58 RQ657 Red	B58 HQ658 Sandstone	B60 VQ655 Hardener for Colors	B58 DQ550 Hi-Build Additive
100-51-6	Phenylmethanol	Not Established			1.0		> 20		> 20					30 - 40	
25154-52-3	§ Nonylphenol	Not Established					< 10		< 10						
98-54-4	Paratertiarybutylphenol	Not Established												1	
140-31-8	Aminoethylpiperazine	Not Established					< 10		< 10						
Unknown	Epoxy Polymer	Not Established				87		54		49	54	54	46		
Unknown	Polyamines	Not Established					40 - 60		50 - 60					30	
Unknown	Amine	Not Established												1	
2855-13-2	Isophorone Diamine	Not Established			0.02									8	
1761-71-3	Methylene Dicyclohexylamine	Not Established												3	
14808-60-7	Quartz	0.1	0.1	Mg/M3	as Resp. Dust			22		33	34	27	30		92
14807-96-6	Talc	2	2	Mg/M3	as Resp. Dust			2		2	2	2	11		8
13463-67-7	Titanium Dioxide	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]			16			4				
65997-17-3	Glass	5		Mg/M3									7		
1333-86-4	Carbon Black	3.5	3.5	Mg/M3							0.2				
	Weight per Gallon (lbs.)					9.7	8.3	13.0	7.7	12.3	12.1	12.6	12.3	8.5	22.2
	Photochemically Reactive					No	No	No	No	No	No	No	No	No	No
	HMIS (NFPA) Rating (health - flammability - reactivity)					2* - 0 - 0	3* - 1 - 1	2* - 0 - 0	3* - 1 - 1	2* - 0 - 0	2* 1 0	2* - 0 - 0	2* - 0 - 0	3* - 1 - 0	2* - 0 - 0

PERCENT BY WEIGHT

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFR 372.65 C

→→→ *MSDS Text Page Follows* →→→

ArmorSeal™ 650SL 100% Solids, Self-Leveling Epoxy AS-650

;ection 3 — Physical Data

'RODUCT WEIGHT	see TABLE	*EVAPORATION RATE*	Slower than Ether
'PECIFIC GRAVITY	0.93-2.67	*VAPOR DENSITY*	Heavier than Air
OILING POINT	N.Av.	*MELTING POINT*	N.A.
'OLUBILITY IN WATER	N.A.		

;ection 4 — Fire And Explosion Hazard Data

'LAMMABILITY CLASSIFICATION *FLASH POINT* Not Applicable *LEL* N.A. *UEL* N.A.
Not Applicable

XTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam

NUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the buildup of pressure) when exposed to extreme heat

'PECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. ater spray may be ineffective. If water is used, fog nozzles are preferable. Water may be sed to cool closed containers to prevent pressure build-up and possible autoignition or xplosion when exposed to extreme heat.

;ection 5 — Health Hazard Data

OUTES OF EXPOSURE
Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. o minimize exposure, follow recommendations for proper use, ventilation, and personal rotective equipment.

CUTE Health Hazards

'FFECTS OF OVEREXPOSURE
Irritation of eyes, skin and respiratory system. B60VQ650, B60VQ651 and B60VQ655 may cause urns on contact with skin or eyes.

'IGNS AND SYMPTOMS OF OVEREXPOSURE
Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure o vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

'EDICAL CONDITIONS AGGRAVATED BY EXPOSURE
May cause allergic skin reaction in susceptible persons.

'MERGENCY AND FIRST AID PROCEDURES

f INHALED:	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
f on SKIN:	Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.
f in EYES:	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
f SWALLOWED:	For B60VQ650, B60VQ651 and B60VQ655 alone -- Never give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give several glasses of water. Seek medical attention. For other products and catalyzed product -- Get medical attention.

HRONIC Health Hazards

Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on xperimental animal data, however, there is insufficient evidence in humans for its arcinogenicity.

Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to igh levels of silica dust, which can occur only when sanding or abrading the dry film, may ause lung damage (silicosis) and possibly cancer.

Rats eposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such xposure levels are not attainable in the workplace.

;ection 6 — Reactivity Data

'TABILITY – Stable

'ONDITIONS TO AVOID
None known.

NCOMPATIBILITY
None known.

'AZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide, Oxides of Nitrogen, possibly of Hydrogen Cyanide

'AZARDOUS POLYMERIZATION – Will Not Occur

Section 7 —Spill or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD
Waste from these products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 —Protection Information

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor. Do not permit contact with ski and eyes. Wash hands after using.
These coatings may contain materials classified as nuisance particulates (listed "as Dust" Section II) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section II, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).

VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section II.
When sanding, wirebrushing, abrading, burning, or welding the dried film, wear a particulat respirator approved by by NIOSH/MSHA for protection against non-volatile materials in Section II.

PROTECTIVE GLOVES
To prevent skin contact, wear neoprene gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION
To prevent eye contact, wear neoprene safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT
To prevent skin contact, use of barrier cream on exposed skin is recommended.

Section 9 —Precautions

DOL STORAGE CATEGORY – 3B

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS
These products may be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

Section 10 —Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: B58AQ655, B58AQ656, B58DQ550, B58HQ658, B58RQ657, B58WQ651 contain a chemical kno to the State of California to cause cancer.

TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventor

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the products. Since condition of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

SHERWIN WILLIAMS®

Heavy Duty Floor Coatings

8.25

ARMORSEAL® 650 SL/RC

SELF-LEVELING/RECOATABLE EPOXY

PART A	B58Q	SERIES
PART B	B60VQ655	HARDENER FOR COLORS
PART B	B60VQ650	HARDENER FOR CLEAR
PART B	B60VQ651	HARDENER FOR WHITE

PRODUCT INFORMATION

Revised 1/2000

PRODUCT DESCRIPTION

ARMORSEAL 650SL/RC SELF-LEVELING/RECOATABLE EPOXY is a 2 component, high performance floor system that provides a high gloss, seamless, hygienic surface that is extremely hard wearing and durable. The coating can also be applied to provide a nonslip texture. This product may be topcoated if required.

- Suitable for use in USDA inspected facilities
- Chemical Resistant
- Impact Resistant
- Abrasion Resistant

RECOMMENDED USES

ArmorSeal 650 SL/RC is especially suited for clean rooms, aircraft hangars, laboratories, workshops and light assembly areas.

The product can be applied at thicknesses from 10.0 to 30.0 mils dft.

When a urethane or additional epoxy topcoat is required.

PRODUCT CHARACTERISTICS

Finish:	Full Gloss
Color:	Clear, Haze Gray, Deck Gray, White, Sandstone, and Tile Red
Volume Solids:	100%, mixed
VOC (calculated):	0 g/L; 0.0 lb/gal, mixed
Mix Ratio:	2 component, premeasured

Recommended Spreading Rate per coat:

Wet mils:	10.0 - 30.0
Dry mils:	10.0 - 30.0
Coverage:	50 - 160 sq ft/gal approximate

Drying Schedule 10.0 mils wet @ 50% RH:

	@ 55°F	**@ 72°F**	**@ 95°F**
To touch:	16-24 hours	6 - 12 hours	4-8 hours
To recoat:			
minimum:	36 hours	8 hours	6 hours
maximum:	72 hours	72 hours	72 hours
Foot Traffic:	48 hours	24 hours	18 hours
Heavy Traffic	96 hours	72 hours	60 hours
To cure:	7 days	7 days	7 days
Pot Life:	60 minutes	40 minutes	20 minutes
Sweat-in-Time:	none required	none required	none required

Drying time is temperature, humidity, and film thickness dependent. Abrade surface if recoating after 72 hours.

Shelf Life:	18 months, unopened, at 72°F
Flash Point:	200°F, PMCC, mixed
Reducer/Clean Up:	Reducer #54, R7K54, clean up only

PERFORMANCE CHARACTERISTIC

- Abrasion resistant
- Excellent adhesion properties
- Chemical resistant
- Impact resistant
- Self - leveling properties
- Provides a seamless-high build durable coating
- Solvent resistant
- Dry heat resistance: 200°F

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PRODUCT INFORMATION

RECOMMENDED SYSTEMS

Concrete:

1 ct.	ArmorSeal 33 Primer @ 8.0 mils dft
1 ct.	ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

Concrete:

1 ct.	ArmorSeal Water Based Epoxy Primer @ 2.0 - 3.0 mils dft
1 ct.	ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

Concrete:

1 ct.	ArmorSeal Floor-Plex Primer @ 1.5 - 2.0 mils dft
1 ct.	ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

Steel:

1 ct.	Recoatable Epoxy Primer @ 4.0 - 5.0 mils dft
1 ct.	ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

The systems listed above are representative of the products use, other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

* Iron & Steel:	SSPC-SP6
* Concrete & Masonry:	SSPC-SP13/NACE 6
* Primer required	

COLOR AVAILABILITY

Do not tint.

Color: Clear, Haze Gray, Deck Gray, White Sandstone, and Tile Red

APPLICATION CONDITIONS

Temperature:	55°F minimum, 95°F maximum (air, surface, and material) At least 5°F above dew point
Relative humidity:	85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	1 gallon and 5 gallon units
Weight per gallon:	10.4 ± 0.2 lb, mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

SHERWIN WILLIAMS

Heavy Duty Floor Coatings

8.25A

ARMORSEAL® 650 SL/RC

SELF-LEVELING/RECOATABLE EPOXY

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PART B	B60VQ650	HARDENER FOR CLEAR
PART B	B60VQ651	HARDENER FOR WHITE

APPLICATION BULLETIN

Revised 1/2000

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Poured Concrete
New
For surface preparation, refer to SSPC-SP13/NACE 6. Surface must be clean, dry, sound, and offer sufficient profile to achieve adequate adhesion. Minimum substrate cure is 28 days at 75°F. Remove all form release agents, curing compounds, salts, efflorescence, laitance, and other foreign matter by sandblasting, shotblasting, mechanical scarification, or suitable chemical means, such as muriatic acid etch, refer to ASTM D4260. Rinse thoroughly to achieve a final pH between 6.0 and 10.0. Allow to dry thoroughly prior to coating.

Old
Surface preparation is done in much the same manner as new concrete; however, if the concrete is contaminated with oils, grease, chemicals, etc., they must be removed by cleaning with a strong detergent. Refer to ASTM D4258. Form release agents, hardeners, etc. must be removed by sandblasting, shotblasting, mechanical scarification, or suitable chemical means. If surface deterioration presents an unacceptably rough surface, ArmorSeal Crack Filler is recommended to patch and resurface damaged concrete.
Fill all cracks, voids and bugholes with ArmorSeal Crack Filler.

Always follow the ASTM methods listed below:
ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM D4263 Plastic Sheet Method for Checking Moisture in Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete

Iron & Steel
Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils). Prime any bare steel the same day as it is cleaned.

Previously Painted Surfaces:
If in sound condition, clean the surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, additional abrasion of the surface and/or removal of the previous coating may be necessary. Retest surface for adhesion. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

APPLICATION CONDITIONS

Temperature:	55°F minimum, 95°F maximum (air, surface, and material) At least 5°F above dew point
Relative humidity:	85% maximum

APPLICATION EQUIPMENT

Reducer/Clean Up: .... Reducer #54, R7K54, clean up only

Roller
Cover .... 3/8" woven with phenolic core
Reduction .... not recommended

Trowel .... Acceptable
Reduction .... not recommended

Squeegee .... Acceptable
Reduction .... not recommended

Spike Roller .... Required

If specific application equipment is listed above, equivalent equipment may be substituted.

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Heavy Duty Floor Coatings

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APPLICATION BULLETIN

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

To mix 1 gallon units: Use electric or air mixer (approximately 250 rpm) with metal mixing blade (Jiffy Model HS or equal). Premix both components for 1-2 minutes, then pour hardener contents into slack-filled resin can. Mix for 2 to 3 minutes, moving blade around can while mixing. Avoid whipping in air while mixing. To mix 5 gallon units use same procedure as mixing 1 gallon units except a larger blade (Jiffy Model ES or equal) is required.

With material freshly mixed, working out of a paint pan or bucket, roll material on floor to desired thickness with a 3/8" nap soft woven roller or equivalent. Check film thickness frequently. After 20-30 minutes setup time, material should be rolled with a spiked roller to remove any entrapped air. Do not spike roll after 40 minutes.

If a slip-resistant texture is desired, broadcast a clean, dry 30-50 mesh silica sand into the ArmorSeal 33 Primer coat immediately after application. Broadcast sand until the primer is saturated and only dry sand is showing. After the primer has set (6 hours minimum), sweep excess sand off the surface. Then topcoat with 15-20 mils of ArmorSeal 650 SL/RC. Lower topcoat thickness will produce more pronounced slip-resistant profiles, heavier topcoats will produce smoother profiles. Spike rolling is not necessary when ArmorSeal 650 SL/RC is applied as a slip-resistant coating.

Recommended Spreading Rate per coat:

Wet mils:	10.0 - 30.0
Dry mils:	10.0 - 30.0

Drying Schedule 10.0 mils wet @ 50% RH:

	@ 55°F	**@ 72°F**	**@ 95°F**
To touch:	16-24 hours	6 - 12 hours	4-8 hours
To recoat:			
minimum:	36 hours	8 hours	6 hours
maximum:	72 hours	72 hours	72 hours
Foot Traffic:	48 hours	24 hours	18 hours
Heavy Traffic	96 hours	72 hours	60 hours
To cure:	7 days	7 days	7 days
Pot Life:	60 minutes	40 minutes	20 minutes
Sweat-in-Time:	none required	none required	none required

Drying time is temperature, humidity, and film thickness dependent.
Abrade surface if recoating after 72 hours.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

PERFORMANCE TIPS

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

No reduction of material is recommended as it can affect film build, appearance, and adhesion.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

When recoating ArmorSeal 650 SL/RC it must be done no less than 8 hours and no more than 72 hours after applying the first coat. If this "window" has passed, the surface of the cured ArmorSeal 650 SL/RC must be abraded to ensure the adhesion of subsequent coats.

When coating previously painted surfaces, always apply a test patch and examine for lifting and proper intercoat adhesion. If lifting occurs, remove the old coating or apply an appropriate barrier coat.

Refer to Product Information sheet for additional performance characteristics and properties.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Reducer #54, R7K54. Clean tools immediately after use with Reducer #54, R7K54. Follow manufacturer's safety recommendations when using any solvent.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

107.02

SHERWIN WILLIAMS®

ACRYLIC LATEX FLOOR ENAMEL
A24 SERIES

CHARACTERISTICS

Use for:
- interior
- exterior
- floors, steps
- moldings

Use on:
- Concrete
- Wood
- Steel

Outstanding Features:
- Hard, durable finish
- Excellent for floors and other surfaces
- Uniform low luster appearance
- Easy to apply
- Low Odor

Color:	5 package colors
Coverage:	
Recommended:	400 sq ft/gal @ 4 mils wet; 1.4 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent	
Touch:	1 hour
Recoat:	24 hours
Light Foot Traffic:	24 hours
Heavy Foot Traffic:	3 days
Flash Point:	201°F, PMCC
Finish:	15-25 units @ 60°
Solvent/Reducer:	Water
Vehicle Type:	Acrylic
VOC (as packaged): 154-176 g/l (less water)	~~72 grams/liter, 0.60 lb/gal~~
Volume Solids:	34 ± 2%
Weight Solids:	43 ± 2%
Weight per Gallon:	9.7 lb

APPLICATION

Stir thoroughly before use.
Do not apply at temperatures below 50°F.

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 1/4"-3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.017"-.021"
Reduction	up to 1 pint/gallon

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull or scrubbed with an abrasive cleaner.

Concrete and Cement Floors
All surfaces must be cured according to the supplier's recommendations. Remove all form release and curing agents. Patch holes or cracks with an appropriate filler. Concrete must be free of moisture as much as possible (moisture seldom drops below 15% in concrete). Test for moisture or dampness by taping the edges of a 2 foot by 2 foot plastic sheet on the bare surface (an asphalt tile or other moisture impervious material will also do), sealing all of the edges. After 48 hours, inspect for moisture, discoloration, or condensation on the concrete or the underside of the plastic. If moisture is present, the source must be located and the cause corrected prior to painting.
Any area saturated with grease or oil should be covered with dry sand or grease absorbing powder and allowed to sit overnight. Sweep up sand or powder. Scrub the surface using warm water and a powdered commercial cleaner or a degreasing cleaner. Rinse well with clean water. Repeat if oil and grease are not completely removed. Bare concrete should be etched with a 5% Muriatic Acid solution. New concrete should not be etched for at least 30 days. Rinse thoroughly. Neutralize any acid left on the surface with a solution of one gallon of warm water and ½ cup of powdered commercial cleaner. Rinse and allow to dry thoroughly.

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107.02

ACRYLIC LATEX FLOOR ENAMEL

A24 SERIES

SURFACE PREPARATION

Because water will collect in low spots and deposit etching and cleaning residue, it is recommended that the floor be vacuumed to remove any remaining water.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Prime interior wood with one coat of PrepRite Wall and Wood Primer, prime exterior wood with A-100 Exterior Oil Wood Primer

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned. Prime bare steel with one coat of Kem Kromik Universal Metal Primer.

LABEL ANALYSIS

A24W15

Pigment by Weight	19%
Titanium Dioxide	12%
Silica/Silicates	3%
Calcium Carbonate	2%
Organic Polymer	2%
Vehicle by Weight	81%
Acrylic Resin	22%
Water	51%
Glycols	3%
Additives	5%
Total	100%

CAUTIONS

Do not apply at temperatures below 50°F.

HEAVY MACHINERY, CAR OR TUCK TRAFFIC, GAS, OIL, SALT OR INDUSTRIAL CLEANERS MAY CAUSE FAILURE OF THE PAINT FILM. NOT SUITABLE FOR USE ON FLOORS WHERE THERE WILL BE AUTOMOBILE OR TRUCK TRAFFIC.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB532

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

— Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number (216) 566-2917
Information telephone number (216) 566-2902
Date of preparation March 12, 1998

Latex Special Purpose Finishes

LS/1

— Section 2 — CAS No.	Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	ACRYLIC LATEX FLOOR ENAMEL A24 A 10 Light Gray A24 R 14 Tile Red A24 A 11 Medium Gray A24 W 15 White A24 G 12 Evergreen	PROMAR® EXT. LATEX BARN PAINT B42 RA 12 Red B42 WA 12 White	VAPOR BARRIER 154-6407 Vapor Barrier	GLAZING LIQUID A46 T 6 Glazing Liquid
112-34-5	§ 2-(2-Butoxyethoxy)-ethanol	Not Established			0.1	3			
107-21-1	§ Ethylene Glycol.	C 50	50	PPM	0.1	2 - 3		1	5
14464-46-1	Cristobalite	0.05	0.05	Mg/M3	as Resp. Dust	0.1 - 0.2	1		0.2
1332-58-7	Kaolin	2	5	Mg/M3	as Resp. Dust		3 - 6		
12001-26-2	Mica	3	3	Mg/M3	as Resp. Dust			5	
471-34-1	Calcium Carbonate.	10	15[5]	Mg/M3 [Resp.	as Dust Fraction]	2 - 3		10	6
13463-67-7	Titanium Dioxide.	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]	0 - 12	15 In White only	4	
1314-13-2	Zinc Oxide	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]		1 In White only		
1333-86-4	Carbon Black.	3.5	3.5	Mg/M3		0 - 0.2			
	§ Zinc Compound. [% Zinc]						1 [1.2] in White only		
	Weight per Gallon (lbs.)					9.0 - 9.8	9.3 - 10.1	10.0	8.9
	Percent Water					51.2 - 61.6	54.7 - 59.5	50.2	63.8
	VOC (Volatile Organic Compounds) Total - lbs./gal.					0.5 - 0.6	0.4	0.3	0.7
	VOC Less Water & Federally Exempt Solvents - lbs./gal.					1.3 - 1.5	1.3	0.8	2.1
	Photochemically Reactive					No	No	No	No
	Flash Point (°F)					None	None	None	None
	HMIS (NFPA) Rating (health - flammability - reactivity)					2* - 0 - 0	1* - 0 - 0	2 - 0 - 0	2* - 0 - 0

PERCENT BY WEIGHT

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFR 372.65 C

→→→ MSDS Text Page Follows →→→

Section 3 — Physical Data

PRODUCT WEIGHT	See TABLE	*EVAPORATION RATE*	Slower than Ether
SPECIFIC GRAVITY	1.02-1.35	*VAPOR DENSITY*	Heavier than Air
BOILING RANGE	212-477 °F	*MELTING POINT*	N.A.
VOLATILE VOLUME	44-85 %	*SOLUBILITY IN WATER*	N.A.
pH	9.0-9.5 %		

Section 4 — Fire And Explosion Hazard Data

FLAMMABILITY CLASSIFICATION *FLASH POINT* See TABLE *LEL* N.Ap. *UEL* N.Ap.

Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 5 — Health Hazard Data

ROUTES OF EXPOSURE

Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. To minimize exposure, follow recommendations for proper use, ventilation, and personal protective equipment.

ACUTE Health Hazards

EFFECTS OF OVEREXPOSURE

Irritation of eyes, skin and upper respiratory system. In a confined area vapors in high concentration may cause headache, nausea or dizziness.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED:	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN:	Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.
If in EYES:	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If SWALLOWED:	Get medical attention.

CHRONIC Health Hazards

Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on experimental animal data, however, there is insufficient evidence in humans for its carcinogenicity.

Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.

Ethylene Glycol is considered an animal teratogen. It has been shown to cause birth defects in rats and mice at high doses when given in drinking water or by gavage. There is no evidence to indicate it causes birth defects in humans.

Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver and urinary systems.

Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Section 6 — Reactivity Data

STABILITY – Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION – Will Not Occur

Section 7 — Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Waste from these products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 — Protection Information

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

These coatings may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Section 9 — Precautions

DOL STORAGE CATEGORY – Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 10 — Other Regulatory Information

CALIFORNIA PROPOSITION 65

WARNING: 154-6407, A24A10, A24A11, A24G12, A24W15, A24W100 and A24W200 contain a chemical known to the State of California to cause cancer. A5W101, A5W102, A5W103, A24R14, A24W300, A24W301, A46T6, B25W35, B42RA12 and B42WA12 contain chemicals known to the State of California to cause cancer.

TSCA CERTIFICATION

All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

covers MSDS pages LS/1 to LS/3

ATTACHMENT 5 page 1

MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : PSX 700 ANSI #70 GRAY RESIN
IDENTIFICATION NUMBER: 700B20072
PRODUCT CLASS : ENGINEERED SILOXANE; PATENTS -5,618,860 & 5,275,645
HEALTH : WARNING HMIS/NFPA : H2F1R0

Ameron International
Protective Coatings Group
201 North Berry St.
Brea, CA 92821

EMERGENCY:800-424-9300 (ChemTrec)
24 Hours Emergency Hotline

INFORMATION: H. Kline, PHONE: 714-529-1951 PREPARE DATE: 10/12/99
PREVIOUS REVISION DATE: 01/15/99

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

ITEM	CHEMICAL NAME	CAS NUMBER	WT/WT % LESS THAN
01	PROPRIETARY (Methanol, hydrolysis generated, 250 ppm ceiling)	PROPRIETARY	40.0 %
02	PROPRIETARY (Epch**# <10ppm, DGE 130ppm, trace phenyl glycidyl ether**)	PROPRIETARY	35.0 %
03	+ TITANIUM DIOXIDE (As TI, trace impurities, <6% aluminum hydroxide, <10% amorphous silica)	13463-67-7	20.0 %
04	CALCIUM SILICATE	13983-17-0	10.0 %
05	SILICA (AMORPHOUS) (CAS # also 7631-86-9)	112926-00-8	5.0 %

(Continued on Page 2)

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

EXPOSURE LIMITS

	ACGIH		OSHA		VP	TOXICITY	
ITEM	TLV-TWA ppm	TLV-TWA Mg/M3	PEL-TWA ppm	PEL-TWA Mg/M3	mmHg @68F	LD50 g/kg	LC50 ppm

ATTACHMENT 5 page 2

01	dna	dna	dna	dna	N.A.	dna	dna
02	dna	dna	dna	dna	N.A.	2.000	dna
03	dna	5.00	dna	5.000	N.A.	10.000	6820.000
04	dna	5.00	dna	5.000	N.A.	dna	dna
05	dna	3.0	dna	5.0	N.A.	dna	dna

REGULATORY: **CALIF.TITLE 26:22-12000 (PROP 65). WARNING: This product contains a chemical known to the State of California to cause cancer. #CALIF.TITLE 26:22-12000 (PROP 65). WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. All ingredients are on TSCA inventory or are exempt. Toxic chemicals marked (SARA, CERCLA, HAPs) are subject to reporting requirements of SARA (40CFR 355 and 372), CERCLA (40CFR 302), or HAPs (40CFR 63).

(S)=Skin; LD50=Dermal.rabbit; LC50=Inhalation,rat; dna=data not available; na=not applicable

SECTION 3 - HAZARDS IDENTIFICATION

EXPOSURE EFFECTS: Vapor or spray mist or spattered material can be harmful. Irritating to eyes, skin, and if inhaled; to nose and throat. Excessive or prolonged inhalation can cause headache, nausea or dizziness. Repeated and prolonged occupational overexposure to solvents is associated with permanent brain and nervous system damage. Intentional abuse, misuse or other massive exposure to solvents may cause multiple organ damage and/or death.

OVER-EXPOSURE (prolonged or repeated use): CAN AGGRAVATE OR ACCENTUATE ANY OF THESE EFFECTS.

SKIN: Irritant. Sensitization or allergic reaction, such as rash or hives.

INHALATION: Irritant. Lung injury. Respiratory sensitization and allergic reaction such as asthma.

EYES: Irritant.

INGESTION: Harmful if swallowed.

TARGET ORGANS: Lungs. Skin. Eyes. Stomach.

MEDICAL CONDITIONS AGGRAVATED: Skin. Eyes. Respiratory.

(Continued on Page 3)

SECTION 3 - HAZARDS IDENTIFICATION

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT INHALATION INGESTION EYE CONTACT

SECTION 4 - FIRST AID MEASURES

FIRST AID PROCEDURES: Inhalation: Remove to fresh air. Restore normal breathing. Treat symptomatically. See physician. SKIN: Wash thoroughly with soap and water.Remove contaminated clothing.Consult physician if irritation persists. EYES: Flush immediately with plenty of water for at least 15 minutes and get medical attention. INGESTION: Drink 1 or 2 glasses of water to dilute.Never give anything by mouth to an unconscious person.Do not induce vomiting(unless METHANOL; listed in Section 2). Consult physician or poison control center IMMEDIATELY. Treat symptomatically.

SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT: 207 F (SETA)

LOWER EXPLOSIVE LIMIT: N.A.
UPPER EXPLOSIVE LIMIT: N.A.

FLAMMABILITY - OSHA: COMBUSTIBLE - CLASS IIIB
DOT: NOT REGULATED

EXTINGUISHING MEDIA: FOAM CO2 DRY CHEMICAL

LOWEST FLASHING SOLVENT:

UNUSUAL FIRE AND EXPLOSION HAZARDS: Closed containers may explode when exposed to extreme heat and pressure buildup. May produce a floating fire hazard. Isolate from electrical equipment, sparks, heat and open flame. Vapors may spread long distances, cause flash fire or ignite explosively.

FIREFIGHTING PROCEDURES: Wear full protective equipment, self-contained breathing apparatus. Water may be used to cool closed containers to prevent pressure build-up or explosion when exposed to extreme heat.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL, LEAKS: Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Use absorbent, inert cleanup materials. (DO NOT use sawdust.) Remove absorbent material with non-sparking tools. Place in separate container. Keep out of sewers and waterways. If entry is threatened or occurs, notify local authorities.

(Continued on Page 4)

SECTION 7 - HANDLING AND STORAGE

HANDLING AND STORAGE: Keep container closed, upright when not in use. Store in cool, dry, well-ventilated area. Avoid prolonged storage temperatures above 100F. Use caution when pouring. Avoid breathing sanding dust. Do not weld or flame cut on empty container.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

VENTILATION: Implement administrative and engineering controls to reduce exposure. Provide sufficient ventilation in volume and pattern to keep air contaminant concentrations below the TLV limits. Remove welding or flame cutting decomposition products; follow current,ANSI Z49.1,"Safety in Welding and Cutting". Refer to 29 CFR parts 1910 and 1915, for coating operations; part 1910.146, Confined Spaces.

RESPIRATORY PROTECTION: Wear NIOSH/MSHA certified respirator designed to remove a combination of particulates (dust or spray mist) and vapor. When brushing, rolling or spreading; select the appropriate respiratory protection for the conditions. For specific conditions, refer to current "NIOSH Pocket Guide to Chemical Hazards". In confined or restricted ventilation areas use air-line respirators or hoods. Refer to 29 CFR, OSHA parts 1910.134 and 1915 for coating operations;part 1910.146 Confined Spaces;ANSI Z88.2,Practices for Respiratory Protection; 42 CFR, part 84 Particulate Respirators.

PROTECTIVE CLOTHING AND EQUIPMENT: Dependent upon application method, wear resistant coveralls, gloves and shoe coverings to prevent skin contact. Wear solvent resistant glasses with splash guards or face shield to protect eyes from splash, spatter and/or spray mist.Consult 29 CFR 1910.132, 133, 136, 138; ANSI Z87.1, Z41. Use explosion and spark-proof equipment.

HYGIENIC PRACTICES: Wash thoroughly after handling and before eating, smoking or using toilet. Launder contaminated clothing before use. Destroy contaminated leather and absorbent shoes which cannot be decontaminated.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

BOILING RANGE : 212 - 212 F
ODOR : NA
APPEARANCE : LIQUID
SOLUBILITY IN H2O : NO
EPA MIXED VOC, G/L: 120
THINNER : 900 @ 1 pint
VOLATILE VOLUME % : 0.28

VAPOR DENSITY : Is heavier than air
WEIGHT PER GAL : 11.4290
EVAPORATION RATE: Is slower than Butyl Acetate
EPA MIXED THIN VOC, G/L : 204
PHOTOCHEMICALLY REACTIVE: No

(Continued on Page 5)

SECTION 10 - STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Heat, open flame, arc or sparks. Water or moisture.

INCOMPATIBILITY: Strong oxidizers, acids and alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS: +Pigment content is dependent on color. (BY FIRE, BURNING OR WELDING); CO, CO2. Aldehydes. Silicon oxide fumes. Methanol. Formaldehyde at temperatures above 300F (150C).

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

SECTION 11 - TOXICOLOGICAL PROPERTIES

TOXICOLOGICAL PROPERTIES: See Section 2.

SECTION 12 - ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: No Information.

SECTION 13 - DISPOSAL CONSIDERATIONS

EPA Waste No.: None

DISPOSAL METHOD: Place in separate, appropriate, closed container in accordance with all applicable local, State, and Federal regulations. This material has NOT been tested by Toxicity Characteristic Leaching Procedure (TCLP).

SECTION 14 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Paint

DOT HAZARD CLASS: NA HAZARD SUBCLASS: NA

DOT UN/NA NUMBER: Not Regulated IMO: NA PACKING GROUP : NA

SECTION 15 - REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: AS FOLLOWS -

(Continued on Page 6)

SECTION 15 - REGULATORY INFORMATION

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

NEW JERSEY RIGHT-TO-KNOW:
The following materials are non-hazardous, but are among the top five components in this product:

----------- CHEMICAL NAME ----------- CAS NUMBER
No non-hazardous materials are among the top five ingredients.

PENNSYLVANIA RIGHT-TO-KNOW:
The following non-hazardous ingredients are present in the product at greater than 3%:

----------- CHEMICAL NAME ----------- CAS NUMBER
No non-hazardous ingredients are present at greater than 3%.

INTERNATIONAL REGULATIONS: AS FOLLOWS -

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for use of the 16 headings.

CANADIAN WHMIS CLASS: No information available.

SECTION 16 - OTHER INFORMATION

DATE PRINTED: 10/12/99

Bayer

MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
PRODUCT SAFETY & REGULATORY AFFAIRS
100 Bayer Road
Pittsburgh, PA 15205-9741

TRANSPORTATION EMERGENCY		NON-TRANSPORTATION	
CALL CHEMTREC:	(800) 424-9300	BAYER EMERGENCY PHONE...:	(412) 923-1800
DISTRICT OF COLUMBIA:	(202) 483-7616	BAYER INFORMATION PHONE.:	(800) 662-2927

I. PRODUCT IDENTIFICATION:

PRODUCT NAME........: Desmodur N-3300 Unstabilized
PRODUCT CODE........: DA-81
CHEMICAL FAMILY.....: Aliphatic Polyisocyanate
CHEMICAL NAME.......: 1,6-Hexamethylene Diisocyanate Based Polyisocyanate
SYNONYMS............: Polymeric Hexamethylene Diisocyanate
FORMULA.............: Not Applicable

II. HAZARDOUS INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
Homopolymer of HDI 28182-81-2	OSHA : Not Established ACGIH: Not Established	Essentially 100 %

The recommended Manufacturer Guideline Level (MGL) for HDI based Polyisocyanates is: 0.5 mg/m3 (TWA - averaged over 8 hours) and 1.0 mg/m3 Short Term Exposure (STEL - averaged over 15 minutes)

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
Hexamethylene Diisocyanate (HDI) 822-06-0	OSHA : Not Established ACGIH: .005 ppm TWA	* %

Monomer content is less than 0.2% based on resin solids at the time of manufacturer. Bayer also recommends a ceiling level of 0.02 ppm (Manufacturer Guideline Level (MGL)).

III. PHYSICAL PROPERTIES:

PHYSICAL FORM.............: Liquid
COLOR.....................: Clear/Pale Yellow
ODOR......................: Slight
MOLECULAR WEIGHT..........: Approx. 500 (polyisocyanate)
BOILING POINT.............: Approx. 446 F (230 C)

Continued on next page

III. PHYSICAL PROPERTIES (Continued)

MELTING/FREEZING POINT....: Not established
SOLUBILITY IN WATER ....: Resin is insoluble - reacts slowly with water to liberate CO2 gas.
SPECIFIC GRAVITY ....: 1.17 @ 68 F (20 C)
BULK DENSITY...............: 9.76 lbs/gal
% VOLATILE BY WEIGHT.......: Negligible
VAPOR PRESSURE ....: Polyisocyanate: Approx. 7.5 x 10-5 mm Hg @ 20 C

IV. FIRE AND EXPLOSION DATA:

FLASH POINT.....................: 460.0 F (237.7 C) Setaflash (ASTM D-3243, D-3278, D-3828)
AUTO-IGNITION TEMPERATURE.......: 860 F (460 C) DIN 71794
EXTINGUISHING MEDIA.............: Dry Chemical; Carbon Dioxide; Foam; Water spray for large fires.
SPECIAL FIRE FIGHTING PROCEDURES: Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters. During a fire, HDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion (See Section VIII.) Closed container may explode when exposed to extreme heat or burst when contaminated with water (CO2 evolved).

V. HUMAN HEALTH DATA:

ROUTE(S) OF ENTRY.......: Inhalation; Skin Contact; Eye Contact.

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:
ACUTE INHALATION.............: HDI vapors or mist at concentrations above the TLV or MGL can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction.). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV or MGL with similar symptoms as well as an asthma attack. Exposure well above the TLV or MGL may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever, chills) has also been reported.
CHRONIC INHALATION...........: As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV or MGL. These symptoms, which include: chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses,

Continued on next page

V. HUMAN HEALTH DATA (Continued)

there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including decrease in lung function, which may be permanent. Sensitization may be either temporary or permanent.

ACUTE SKIN CONTACT............: Isocyanates react with skin protein and moisture and can cause irritation. Symptoms of skin irritation may be reddening, swelling, rash, scaling or blistering. Some persons may develop skin sensitization from skin contact. Cured material is difficult to remove.

CHRONIC SKIN CONTACT..........: Prolonged contact with the isocyanate can cause reddening, swelling, rash, scaling or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material or even as a result of vapor-only exposure.

ACUTE EYE CONTACT.............: Liquid, aerosols and vapors of this product are irritating and can cause pain, tearing, reddening and swelling accompanied by a stinging sensation and/or a feeling like that of fine dust in the eyes.

CHRONIC EYE CONTACT...........: May result in corneal opacity (clouding of the eye surface).

ACUTE INGESTION...............: Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract.

CHRONIC INGESTION.............: None Found

CARCINOGENICITY
NTP...........................: Not listed
IARC..........................: Not listed
OSHA..........................: Not regulated

MEDICAL CONDITIONS
AGGRAVATED BY EXPOSURE......: Asthma and other respiratory disorders (bronchitis, emphysema, hyperreactivity), skin allergies, eczema.

EXPOSURE LIMITS...............: Not established for product as a whole. Refer to Section II for exposure limits of hazardous constituents. The Manufacturer Guideline Level of 0.5 mg/m3 - TWA and 1.0 mg/m3 - STEL for the Homopolymer of HDI and 0.02 ppm ceiling for HDI monomer are internal guides based on limited data; they are provided as guides pending the review of future data.

VI. EMERGENCY AND FIRST AID PROCEDURES:

FIRST AID FOR EYES......: Flush with clean, lukewarm water (low pressure) for at least 15 minutes, while lifting eyelids. Refer individual to physician or ophthalmologist for immediate follow-up.

Continued on next page

VI. FIRST AID PROCEDURES (Continued)

FIRST AID FOR SKIN......: Remove contaminated clothing immediately. Wash affected areas thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists.

FIRST AID FOR INHALATION: Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. Consult physician.

FIRST AID FOR INGESTION.: DO NOT INDUCE VOMITING. Give 1 to 2 cups of milk or water to drink. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON. Consult physician.

NOTE TO PHYSICIAN.......: Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation frequently. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: This product is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn. Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the product. Inhalation: This product is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material must be removed from any further exposure to any isocyanate.

VII. EMPLOYEE PROTECTION RECOMMENDATIONS:

REQUIRED WORK/HYGIENE PROCEDURES...: Precautions must be taken so that persons handling this product do not allow contact with the eyes or skin. In spray operations, protection must be afforded against exposure to both vapor and spray mist.

SKIN PROTECTION REQUIREMENTS.......: Permeation resistant gloves. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area protected only by the cream to a minimum.

RESPIRATOR REQUIREMENTS............: A respirator that is recommended or approved for use in isocyanate containing environments (air purifying or fresh air supplied) may be necessary for spray applications or other situations such as high temperature use which may produce inhalation exposures. A supplied air respirator (either positive pressure or continuous flow type) is recommended. Before an air-purifying respirator can be used, air monitoring must be performed to measure airborne concentrations of HDI monomer, HDI polyisocyanate and organic solvent(s). See the outline below for the specific conditions under which air-purifying respirators can be used. Observe OSHA regulations for respirator use (29 CFR 1910.134).

SPRAY APPLICATION:

A. Good industrial hygiene practice dictates that when isocyanate based

Continued on next page

VII. EMPLOYEE PROTECTION (Continued)

coatings are spray applied, some form of respiratory protection should be worn. During the spray application of organic solvent containing coatings systems, the use of a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exists:

- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentrations exceed 0.05 ppm (10 times the TLV); or
- the airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); or
- no airborne solvent concentration exceeds its odor threshold; or
- spraying is performed in a confined space (See OSHA Confined Space Standard 29 CFR 1910.146).

A properly fitted air-purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing spray paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when ALL of the following conditions are met:

- the airborne isocyanate monomer concentrations are known to be below 0.05 ppm (10 times the TLV); and
- the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); and
- at least one solvent has a published odor threshold*; and
- at least one airborne solvent concentration exceeds its odor threshold and that solvent's odor threshold is lower than its TLV

B. During the spray application of a coatings system NOT containing organic solvents a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exists:

- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentration exceeds the TLV of 0.005 ppm; or
- the airborne polyisocyanate (polymeric, oligomeric) concentration exceeds the MGL of 0.5 mg/m3 averaged over 8 hours or 1 mg/m3 averaged over 15 minutes; or
- spraying is performed in a confined space (See OSHA Confined Space Standard 29 CFR 1910.146.)

Under any other circumstances, during spray application of a coatings system NOT containing organic solvents, good industrial hygiene practice dictates that when isocyanate based coatings are spray applied at least an air-purifying respirator should be worn.

NON-SPRAY OPERATIONS:

A. During non-spray operations such as mixing, batch making, brush or roller application, etc., at elevated temperatures (for example, heating of material or application to a hot substrate), it is possible to be exposed to airborne isocyanate vapors. Therefore, when the coatings system contains solvents and will be applied in a non-spray manner, a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exists:

- the airborne isocyanate concentrations are not known; or

Continued on next page

VII. EMPLOYEE PROTECTION (Continued)

- the airborne isocyanate monomer concentrations exceed 0.05 ppm (10 times the TLV); or
-the polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); or
- no airborne solvent concentration exceeds its odor threshold; or
-operations are performed in a confined space (See OSHA Confined Space Standard 49 CFR 1910.146).

A properly fitted air purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when ALL of the following conditions are met:
- the airborne concentrations of the isocyanate monomer are below 0.05 ppm (10 times the TLV); and
- the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m3 averated over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); and
-at least one solvent has a published odor threshold*; and
-at least one airborne solvent concentration exceeds its odor threshold and that solvent's odor threshold is lower than its TLV.

B. During non-spray operations using a solvent-free coatings system, a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exixts:
- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentrations exceed the TLV of 0.005 ppm; or
- the airborne polyioscyante (polymeric, oligomeric) concentrations exceed the MGL of 0.5 mg/m3 averaged over 8 hours, or 1.0 mg/m3 averaged over 15 minutes; or
- operations are performed in a confined space (See OSHA Confined Space Standard 49 CFR 1910.146).

VENTILATION REQUIREMENTS..........: Good industrial hygiene practice dictates that worker protection should be achieved through engineering controls such as ventilation whenever feasible. When such controls are not feasible to achieve full protection, the use of respirators and other personal protective equipment is mandated.(SEE RESPIRATOR REQUIREMENTS) Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination. Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly (i.e. they are released into the work area), it is possible to be exposed to airborne monomeric HDI.

MONITORING........................: Refer to Patty's Industrial Hygiene and Toxicology-Volume 1 (3rd edition) Chapter 17 and volume III (1st edition) Chapter 3-for guidance concerning appropriate air sampling strategy to determine airborne concentrations of isocyanates and solvent.

MEDICAL SURVEILLANCE..............: Medical supervision of all employees who handle or come in contact with this product is recommended. This should include preemployment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum). Persons with asthma-type conditions, chronic bronchitis, other chronic respiratory deseases or recurrent skin eczema or sensitization should be excluded from working with

Continued on next page

VII. EMPLOYEE PROTECTION (Continued)

isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure can be permitted.

ADDITIONAL PROTECTIVE MEASURES.....: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions. For additional information, see Bayer's "Health and Safety Information for Hexamethylene Diisocyanate Based Polyisocyanates".

* We recommend using the Geometric Mean Air Odor Threshold found in Table 5.1 of "Odor Thresholds for Chemicals with Established Occupational Health Standards," - AIHA

VIII. REACTIVITY DATA:

STABILITY....................: This is a stable material.

HAZARDOUS POLYMERIZATION...: May occur; Contact with moisture or other materials which react with isocyanates or temperatures over 400 F (204 C) may cause polymerization.

INCOMPATIBILITIES..........: Water, amines, strong bases, alcohols, metal compounds and surface active materials.

INSTABILITY CONDITIONS.....: None known.

DECOMPOSITION PRODUCTS.....: By high heat and fire: carbon dioxide, carbon monoxide, oxides of nitrogen, HCN, HDI.

IX. SPILL AND LEAK PROCEDURES:

SPILL OR LEAK PROCEDURES....: Evacuate nonessential personnel. Remove all sources of ignition and ventilate the area. Notify appropriate authorities if necessary. Put on personal protective equipment (see Section VII). Dike or impound spilled material and control further spillage if feasible. Cover the spill with sawdust, vermiculite, Fuller's earth or other absorbent material. Pour decontamination solution over spill area and allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution. Remove containers to a safe place, cover loosely, and allow to stand for 24 to 48 hours. Wash down spill area with decontamination solutions. Decontamination solutions: nonionic surfactant Union Carbide's Tergitol TMN-10 (20%) and water (80%); concentrated ammonia (3-8%), detergent (2%) and water (90-95%).

WASTE DISPOSAL METHOD.......: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Incineration is the preferred method. Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH. (See Section IV and VIII).

Continued on next page

X. SPECIAL PRECAUTIONS & STORAGE DATA:

STORAGE TEMPERATURE(MIN/MAX): -30 F (-34 C)/122 F (50 C)
SHELF LIFE..................: 6 months @ 77 F (25 C) after receipt of material by customer.
SPECIAL SENSITIVITY.........: If container is exposed to high heat, it can be pressurized and possibly rupture explosively. HDI reacts slowly with water to form CO2 gas. This gas can cause sealed containers to expand and possibly rupture explosively.
HANDLING/STORAGE PRECAUTIONS: Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. At maximum storage temperatures noted, material may slowly polymerize without hazard. Ideal storage temperature range for ease of handling is 50-81 F (10-27 C). Avoid contact with skin and eyes. Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard.

XI. SHIPPING INFORMATION:

D.O.T. SHIPPING NAME...........: None
TECHNICAL SHIPPING NAME........: Polyisocyanate
D.O.T. HAZARD CLASS............: Non-Regulated
U.N./N.A. NUMBER...............: None
PRODUCT RQ (lbs.) ....: None
D.O.T. LABEL...................: Non-regulated
D.O.T. PLACARD.................: Non-regulated
FREIGHT CLASS BULK.............: Isocyanate
FREIGHT CLASS PACKAGE..........: Chemicals, NOI (Isocyanate), NMFC 60000
PRODUCT LABEL ....: Desmodur N-3300 Unstabilized

XII. ANIMAL TOXICITY DATA:

TOXICITY DATA FOR: HDI homopolymer materials except where indicated.
ACUTE TOXICITY
ORAL LD50..........: Estimated to be greater than 10000 mg/kg (rats). (Based on the results of actual tests conducted using specific HDI-homopolymer products.)
DERMAL LD50........: Estimated to be greater than 5000 mg/kg (rabbits). (Based on the results of actual tests conducted using specific HDI-homopolymer products.)
INHALATION LC50....: Lower respiratory (pulmonary) irritant. LC50 values range from 137-1150 mg/m3 were obtained in rats exposed to aerosols. (4H

Continued on next page

XII. ANIMAL TOXICITY DATA (Continued)

exp.)

EYE EFFECTS........: Severe irritant capable of inducing corneal injury (Rabbit); maximum primary eye irritation score: 54.6/110 for a 24 hr. exposure.

SKIN EFFECTS.......: Moderate irritant; primary dermal irritation score: 3.4/8.0 (rabbit)

SENSITIZATION......: Pulmonary and dermal sensitizer in humans. Delayed dermal sensitization was observed in guinea pigs. However, the respiratory sensitization potential of Desmodur N-3300 assessed in guinea pigs was negative. Evidence exists that cross-sensitization between HDI and other isocyanates, particularly hydrogenated MDI and TDI, can occur.

OTHER ACUTE EFFECTS: AMES TEST: Negative for Desmodur N-100 (100% solids material).

SUBCHRONIC TOXICITY...: Rats exposed to a HDI homopolymer (isocyanurate type, specifically, the solvent-free Desmodur N-3300), at 4.3, 14.7 and 89.8 mg/m3 for three weeks (6 hrs/day, 5 days/wk) exhibited respiratory distress and inflammation of the nasal passages at 14.7 mg/m3 and above. At the 89.8 mg/m3 level, inflammatory lesions at many sites of the lungs were also observed. The No Observable Effect Level (NOEL) was 4.3 mg/m3. Rats were also exposed to an HDI homopolymer (isocyanurate type, specifically, the solvent-free product Desmodur N-3300), for 13 weeks (6 hrs/day, 5 days/wk) at aerosol concentrations of 0.5, 3.3 and 26.4 mg/m3. Body weight gain of male rats of the 26.4 mg/m3 group were slightly reduced toward the end of the study. The lung weight to body weight ratio was significantly increased in the male and female rats of the 26.4 mg/m3 group. Histopathologic diagnosis of these animals revealed inflammatory changes and formation of fibrous tissue at the point of injury in the respiratory tract. In addition, the lung function tests at the end of the study provided evidence of a chronic obstructive lung disorder in rats of the 26.4 mg/m3 group. The No Observable Effect Level (NOEL) in this study is considered to be 3.3 mg/m3.

OTHER TOXICITY DATA...: Mice were exposed to a liquid aerosol of an HDI homopolymer (isocyanurate type, specifically, the solvent-free product Desmodur N-3300), mixed with acetone for three hours. The irritation potential expressed as the RD50 (the concentration which is predicted to reduce the respiratory rate 50%) was 20.8 mg/m3 (95% confidence interval = 18.3 to 23.9 mg/m3). Pulmonary (lung) irritation was observed first, followed by sensory (eye, nose, and throat) irritation.

XIII. FEDERAL REGULATORY INFORMATION:

OSHA STATUS.................: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA STATUS.................: On TSCA Inventory

CERCLA REPORTABLE QUANTITY..: None

XIII. FEDERAL REGULATORY INFORMATION (Continued)

SARA TITLE III:

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES..: None

SECTION 311/312 HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard; Reactive Hazard

SECTION 313 TOXIC CHEMICALS.......: None

RCRA STATUS.................: If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

XIV. OTHER REGULATORY INFORMATION:

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	CONCENTRATION	STATE CODE
Homopolymer of HDI 28182-81-2	Essentially 100 %	PA3, NJ4

NJ4 = New Jersey Other - included in 5 predominant ingredients > 1%
PA3 = Pennsylvania Non-hazardous present at 3% or greater.

CALIFORNIA PROPOSITION 65

To the best of our knowledge, this product contains no levels of listed substances, which the state of California has found to cause cancer, birth defects or other reproductive effects.

MASSACHUSETTS SUBSTANCE LIST (MSL)

Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products. To the best of our knowledge, this product contains no substances at a level which could require reporting under the statute.

HMIS RATINGS:	Health	Flammability	Reactivity
	2*	1	1

Continued on next page

XIV. OTHER REGULATORY INFORMATION (Continued)

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe
*=Chronic Health Hazard

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS ratings are provided by Bayer Corporation as a customer service.

XV. APPROVALS:

REASON FOR ISSUE..........: Revise Sections II, V, VII
PREPARED BY...............: B. J. Gambino
APPROVED BY...............: H. E. Myer
APPROVAL DATE.............: 06/15/95
SUPERSEDES DATE...........: 12/14/94
MSDS NUMBER...............: 07003

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Bayer Corporation. The data on this sheet relates only to the specific material designated herein. Bayer Corporation assumes no legal responsibility for use or reliance upon these data.

SEAL KRETE

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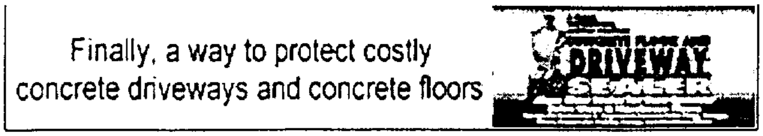


EZ-COAT
SKID PROOF

Product Description:

Skid-Proof EZ-Coat, brush and roll, is a waterborne, acrylic based, quartz, non-cementitious, anti-skid coating. It is environmentally safe, non-flammable, non-hazardous and contains low VOC's (Volatile Organic Compounds). Skid-Proof EZ-Coat is neutral in color allowing the availability of various decorative colors by adding your desired color of Exterior Gloss, Semi-Gloss, Satin Acrylic, Acrylic Floor Enamel or Industrial Acrylic Enamel Paint in a ratio of 1 quart to a 10 pound pail or 1 gallon to a 40 pound pail of Skid-Proof EZ-Coat. Skid-Proof EZ-Coat, when fully cured, is hard and tough; yet flexible. On horizontal surfaces it is anti-skid. On vertical surfaces (i.e. risers on stairways), Skid-Proof EZ-Coat provides a heavy duty textured coating. Skid-Proof EZ-Coat, when fully cured, is waterproof, weather-resistant, impact resistant, salts and chlorine resistant. During and after application, before it has time to dry, Skid-Proof EZ-Coat may be cleaned up with water.

Basic Use: Skid-Proof EZ-Coat is a decorative, protective anti-skid coating for long term preservation of various surfaces including: concrete, wood, plywood and primed metal. Skid-Proof EZ-Coat can be used interior and exterior on horizontal surfaces including traffic areas such as: walkways, patios, stairs, pool decks, balconies, ramps, driveways, carports, etc.

Preparation:

Remove dirt, oils, foreign matter, and previous coatings from surface to be coated. Concrete surfaces must be clean and dry before applying SKID-PROOF EZ-COAT. For best performance, smooth concrete surfaces may require acid-etching before sealing. This is done by applying a 25% diluted solution of muratic acid and water (1 part acid to 4 parts of water). After approximately five minutes, rinse completely with water. A second rinse and/or a neutralizer may be required. Always check pH of surface before coating. A pH reading of 7 - 9 is required before application. Bare metal surfaces require priming with an appropriate metal primer. To insure maximum bond for SKID-PROOF EZ-COAT, seal non-metal surfaces with SEAL-KRETE Waterproofing Sealer before application. Allow sealer to dry a minimum of 2 - 4 hours before applying SKID-PROOF EZ-COAT.

Fill all cracks using a high quality concrete patch mix. To protect areas or surfaces not to be coated from roller splatter, cover with materials such as plastic sheeting, masking tape, etc.

Application:

Add your desired color of Exterior Gloss, Semi-gloss or Satin Acrylic Latex, Acrylic Floor Enamel or Industrial Acrylic Enamel paint, in a ratio of 1 quart to a 10 pound pail or 1 gallon to a 40 pound pail, to the neutral base Skid-Proof EZ-Coat. Mix well with a mechanical mixer or on a shaker. Skid-Proof EZ-Coat will take on the same color as the paint. Skid-Proof EZ-Coat may be applied with a synthetic or **mohair roller only**. The roller must be of the type used for adhesives, epoxies, contact cements and mastics. The nap should not exceed 3/16". Skid-Proof EZ-Coat may also be applied with a brush. The brush must be a high quality polyester/nylon or nylon bristle type.
Important: Apply Skid-Proof EZ-Coat liberally - Do not try to spread out thin. Apply to achieve a uniform textured appearance.
Recommended spread rate is 15-20 mils (wet film thickness per coat).
Normally, two coats of Skid-Proof EZ-Coat will suffice. However, smooth surfaces may

require additional coats. The more porous and profiled the surface is, the better the Skid-Proof EZ-Coat "lay down" properties will be. Smooth concrete should be acid etched, and neutralized thoroughly before application.

Note: A test area should first be applied on surface to be coated for product suitability and desired appearance.

Limitations / Cautions:

Do not apply if the threat of rain is imminent or if rain is expected within 8 hours after the application of SKID-PROOF EZ-COAT

Surface, coating, and air temperature must be above 50 degrees before application. Do not apply coating if the temperature is below 50 degrees F or if it is expected to fall below 50 degrees F for the first 12 hours after application.

Do not freeze. Store at room temperature above 40 degrees F.

Do not add oil/alkyd base paint to SKID-PROOF EZ-COAT.

Do not use Interior Latex paint or Flat Exterior Latex paint.

Do not use regular "off the shelf" latex paint rollers - see application section

Do not spread SKID-PROOF EZ-COAT thin. Apply to achieve a uniformly textured appearance. Keep a "wet edge".

Coating softens when in contact with some solvents such as acetone, xylene, toluene, gasoline, and ketone, but will recover.

SKID-PROOF EZ-COAT should not be used in areas subject to hydrostatic pressure, constant standing water (such as swimming pools, ponds, water holding tanks, waste water treatment tanks, etc.), or on leaky basement walls.

Allow new concrete slabs or concrete patch areas to cure a minimum or 7 days before applying SKID-PROOF EZ-COAT.

As with any coating, SKID-PROOF EZ-COAT may become worn or damaged over time. Proper inspection and maintenance must be followed to ensure required performance of coating.

Coverage: Square foot coverage will vary depending on substrate and thickness applied. Skid-Proof EZ-Coat with paint added will cover approximately 150 square feet per 10 pound pail or 600 square feet per 40 pound pail at 20 mils (wet film thickness).

Application Tools:

Skid-Proof EZ-Coat may be applied with a synthetic or mohair roller only. The roller must be of the type used for adhesives, epoxies, contact cements and mastics. The nap should not exceed 3/16". Skid-Proof EZ-Coat may also be applied with a brush. The brush must be a high quality polyester/nylon or nylon bristle type

Maintenance:

After coating has cured, occasional cleaning is required on horizontal areas subject to traffic. For maximum cleanability, solvent, and chemical resistance, Seal-Krete Concrete Floor and Driveway Sealer is recommended as a non-buffing protective sealer finishes. They provide a clear, hard gloss, protective seal to the finished coating while still maintaining the anti-skid properties. Allow SKID-PROOF EZ-COAT to cure 12 hours minimum before applying the sealer. Two coats are recommended.

Warranty:

Manufacturer/seller makes no warranty of any kind, expressed or implied, except that this product shall be free from defects. Buyer remedies for breach of warranty are limited to replacement of the product, if it is defective, or refund of purchase price, at manufacturers/sellers option. Buyer assumes all risk and liability resulting from use of and disposal of this product. This warranty may not be altered, modified, or expanded by oral statement of any person, agent, salesman, or dealer before, during, or after the sale

Technical Services:

Technical information and any advice furnished by Seal-Krete, Inc. concerning any use or application of SKID-PROOF EZ-COAT, is as reliable as current technology allows. Seal-Krete, Inc., makes no warranty, expressed or implied, of any use or application for which such information or advice is furnished. If additional technical assistance and information is needed, it is available upon request.

Table 1
Coefficient of Friction test (anti-skid test)
(ASTM F-1677 and ASTM F 1679)

Tester	Slider pad	Surface condition	Avg. Slip resistance
XL	Neolite	Dry	.95
XL	Neolite	Wet	.79
XL	Leather	Dry	.60
Mark II	Neolite	Dry	.87
Mark II	Neolite	Wet	.73
Mark II	Leather	Dry	.67

Table 2
Wet Properties

Solids	63.3% ≠ .2%
Weight Per Gallon	10.29≠.15 lbs.
pH	8.5≠ .5
Odor	Slight
Appearance	Earthtone
Viscosity	115 - 120 K.U.
VOC's	40 grams per liter
Dry to recoat	6 hours
Dry to foot traffic	24 hours
Dry to vehicular traffic	72 hours

Table 3
Dry Properties

U.V. Resistance	Excellent
Water Resistance	Excellent
Odor	None
Salt Resistance	Excellent
Flexibility	Excellent
Gasoline & motor oil clean-up	Excellent (1)
Tire marking clean-up	Excellent (1)

(1) When topcoated (2 coats) with Seal-Krete Concrete Floor and Driveway Sealer

Click here for MSDS on Skid-Proof EZ-Coat

Adobe Get Acrobat Reader

Seal-Krete, Inc.
306 Gandy Road
Auburndale, FL 33823

PH: (863)967-1535
FAX (863)965-2326

SHERWIN WILLIAMS®

INDUSTRIAL MAINTENANCE
COATINGS

ARMORSEAL™

HEAVY DUTY FLOOR COATINGS

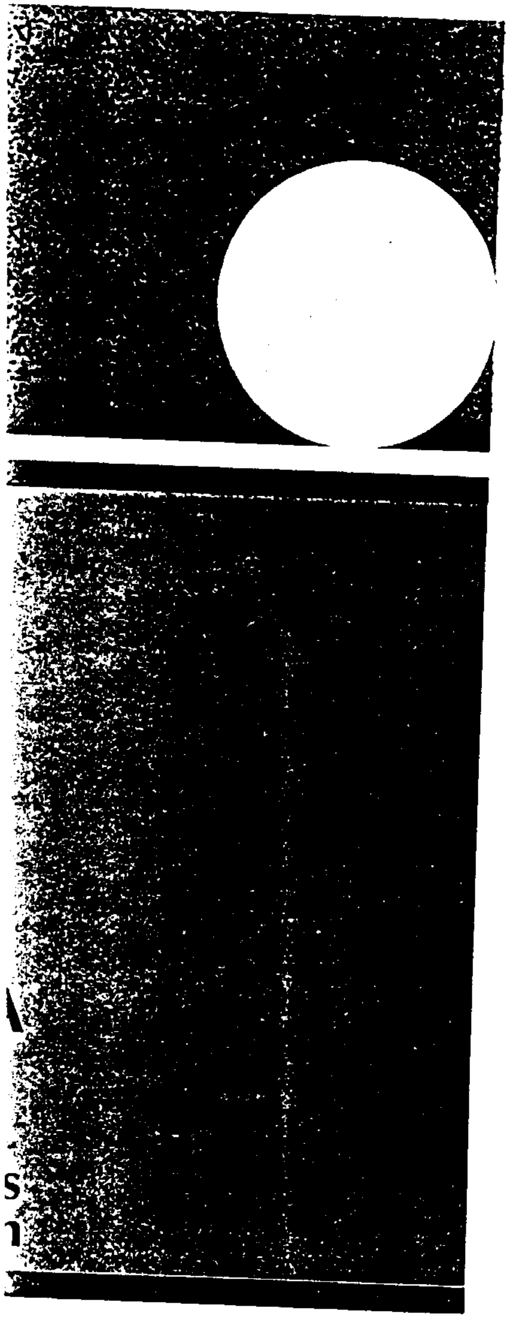
ARMORSEAL 1000

Heavy Duty Marine and Industrial Coating Part A

☐ DECK GRAY B67 AQ 1001
☐ TILE RED B67 RQ 1002
☐ WHITE B67 WQ 1005
☐ HAZE GRAY B67 AQ 1003
☐ SANDSTONE B67 HQ 1004
☐ SAFETY YELLOW B67 YQ 1006

DANGER! FLAMMABLE — VAPOR HARMFUL. IRRITATES EYES, SKIN AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. CAN BE ABSORBED THROUGH THE SKIN. Before using, carefully read CAUTIONS elsewhere on label.

3.78 liters
1 gallon



HEAVY-DUTY MARINE & INDUSTRIAL COATING

For hulls, decks, tanks and superstructures of marine vessels. For masonry and steel structures, storage tanks, pipes, machinery and equipment, concrete floors, etc., in marine and industrial environments.

PIGMENTED RESIN FOR TWO-PART EPOXY RESIN SYSTEM

(Non-Pigmented Hardener Also Required)

SURFACE PREPARATION:

Concrete: Thoroughly clean contaminated areas with commercial degreaser. Acid etch with 15% muriatic acid, rinse well and allow to completely dry.

Steel: Abrasive blast to Commercial Grade SP-6.

Wood: Remove contamination and abrade surface.

Previously Painted Surfaces: Consult your Sherwin-Williams representative for specific performance and application recommendations.

MIXING & APPLICATION INSTRUCTIONS: Pour 1 part resin (pigmented) and 1 part hardener (non-pigmented) into a container and power mix for 2-3 minutes to insure that all pigment is completely dispersed. Allow 30 minutes "sweat-in-time" in covered container before applying. Prime coats are recommended to seal porous surfaces such as concrete and wood. When a prime coat is required, the first coat of ArmorSeal 1000 Series is reduced 1 pint per gallon with R7K54 solvent (after 30 minutes "sweat-in-time"). Allow 8 hours for solvent evaporation and tack free surface before application of second coat. Subsequent coats are not thinned. Antislip additive is mixed into the final coat just prior to application. (EXCEPTION: If antislip is desired with Clear finish, it should be hand broadcast.) When a rust inhibitive primer is required for iron or steel, a coat of ArmorSeal 1014 Rust Inhibitive Epoxy Primer is recommended. Application over rough surfaces will reduce coverage. ArmorSeal 1000 Series epoxy coating is easily sprayed brushed or rolled. A 3/4" pile roller is recommended for the final coat when an antislip aggregate is used. Recommended "airless spray equipment" includes Devilbiss JGA-Gun, Graco Golden Gun, etc. (tip size – 0.015" to 0.021" @ approximately 2500 psi). Material cannot be sprayed if antislip aggregate is used. Clean all equipment with R7K54.

RECOMMENDED SYSTEMS:

Concrete/Wood: 1st coat: ArmorSeal 1000 Series (reduced 1 pint per gallon with R7K54)
2nd coat: ArmorSeal 1000 Series (with antislip aggregate if required)

Steel: 1st coat: ArmorSeal 1014 Rust Inhibitive Primer
2nd coat: ArmorSeal 1000 Series (with antislip aggregate if required)

Painted Surfaces in Sound Condition: 1-2 coats: ArmorSeal 1000 Series

IMPORTANT: When coating previously painted surfaces, always apply test patch and examine for lifting and proper intercoat adhesion. If lifting occurs, remove old coating or apply an appropriate barrier coat.

TECHNICAL INFORMATION:

COVERAGE: 250 to 300 sq. ft./gal. @ 3 to 3.7 mils DFT
(23.2 to 27.9 m²/gal. @ 75 to 95 microns DFT)

APPLICATION TEMPERATURES:
55°F minimum to 95°F maximum
(12°C minimum to 35°C maximum)
•Must be 5°F above dew point

RELATIVE HUMIDITY: 85% maximum

SERVICEABILITY:
Recoat – 8 hours minimum @ 72°F (22°C) @ 50% RH
Foot Traffic – 24 hours @ 72°F (22°C) @ 50% RH
Heavy Service – 72 hours @ 72°F (22°C) @ 50% RH
Full Cure – 5 days @ 72°F (22°C) @ 50% RH

MIXING RATIOS: 1:1 equal parts epoxy resin/hardener

INDUCTION: 30 minutes (sweat-in-time)

POT LIFE: 8 hours @ 72°F (22°C)

FLASH POINT: 86°F TCC (30°C)

VISCOSITY: 70-80 Krebs Units

REDUCER: R7K54

10-92

CAUTIONS

B0319 (12-92)

Contents are **FLAMMABLE**. Vapors may cause flash fires. Keep away from heat, sparks, and open flame. During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition **CONTAINS: ALCOHOLS, AROMATIC HYDROCARBONS, POLYAMIDE RESIN AND XYLENE. VAPOR HARMFUL.** Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area **Do not permit contact with skin and eyes.** Wear neoprene gloves and goggles. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. **FIRST AID:** In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. **If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE:** Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. **This product must be mixed with other components before use.** Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
FOR PROFESSIONAL USE ONLY
NOT FOR RESIDENTIAL USE
SEE MATERIAL SAFETY DATA SHEET

CAS No.	Ingredient
68410-23-1	Polyamide
6528-34-3	Hansa Yellow
1330-20-7	Xylene
7727-43-7	Barium Sulfate
107-98-2	2-Propanol, 1-methoxy-
95-63-6	1,2,4-Trimethylbenzene
108-67-8	1,3,5-Trimethylbenzene
64742-95-6	Light Aromatic Hydrocarbons
100-41-4	Ethylbenzene

B67 YQ 1006 (11 92)

VOC: 646 gms/L – 5.39 lbs/gal

PHOTOCHEMICALLY REACTIVE

0807019520 •76

The Sherwin-Williams Company
Cleveland, Ohio 44101

ATTACHMENT 9 page 1

102.02

SHERWIN WILLIAMS®

A-100®

EXTERIOR LATEX FLAT
A6 SERIES

CHARACTERISTICS

A-100 Exterior Latex Flat is our best quality exterior flat finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.3 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
AT → Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Ultradeep Base	8-12	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (as packaged): 100-156 (less water) ~~57~~ grams/liter; ~~0.40 lbs/gal~~
Volume Solids: 32 ± 2%
Weight Solids: 49 ± 2%
Weight per Gallon: 11.1 lbs

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-96D
TT-P-1510A

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Latex Flat
Brick
1 ct. Masonry Conditioner, or
1 ct. ProMar Masonry Conditioner
2 cts. A-100 Exterior Latex Flat
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Flat
Galvanized Steel
2 cts. A-100 Exterior Latex Flat
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Latex Flat
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Flat
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. A-100 Exterior Latex Flat
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Latex Flat
Vinyl Siding
2 cts. A-100 Exterior Latex Flat
Wood, Composition Board
1 ct. A-100 Oil Exterior Wood Primer
2 cts. A-100 Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum and Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick
All brick must weather at least one year followed by wire brushing to remove all efflorescence. Prime the surface with one coat of Masonry Conditioner.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Ext. Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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A-100®

EXTERIOR LATEX FLAT
A6 SERIES

SURFACE PREPARATION

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Masonry Acrylic Primer.

Vinyl Siding
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A6W501

Pigment by Weight	33%
Titanium Dioxide	15.0%
Zinc Oxide	2.0%
Silica/Silicates	16.0%
Vehicle by Weight	67%
Acrylic Resin	12.9%
Water	47.9%
Glycol	2.0%
Mildewcide	0.2%
Additives	4%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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102.11

SHERWIN WILLIAMS

A-100®

EXTERIOR LATEX SATIN
A82 SERIES

CHARACTERISTICS

A-100 Exterior Latex Satin is our best quality exterior satin finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time, @77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (less exempt solvents): 100 - 110 less water ~~38~~ grams/liter; 0~~.32 lb~~/gal
Volume Solids: 33 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.4 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-P-96D (cancelled)
TT-P-1510A (cancelled)

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Latex Satin
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Latex Satin
Brick
1 ct. Masonry Conditioner
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Cement Composition Siding/Panels
1 ct. Loxon Ext. Acrylic Masonry Primer
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Galvanized Steel
2 cts. A-100 Exterior Latex Satin
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Latex Satin
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Latex Satin
Vinyl Siding
2 cts. A-100 Exterior Latex Satin
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel— Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall— Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Cement Composition Siding/Panels
Clean thoroughly. Do not pressure wash, the pressure may damage the panels. Allow the surface to dry thoroughly. Prime bare panels with an acrylic primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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A-100®

EXTERIOR LATEX SATIN
A82 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A82W510

Pigment by Weight	25%
Titanium Dioxide	20%
Zinc Oxide	2%
Silica/Silicates	3%
Vehicle by Weight	75%
Acrylic Resin	20%
Water	49%
Additives	6%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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SHERWIN WILLIAMS

A-100®

EXTERIOR GLOSS LATEX

A8 SERIES

CHARACTERISTICS

A-100 Exterior Latex Gloss is our best quality exterior gloss finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors

Coverage:

Recommended:	400 sq ft/gal @4 mils wet; 1.3 mils dry

Drying Time, @77°F, 50% RH: temperature and humidity dependent

Touch:	1 hour
Recoat:	24 hours
Flash Point:	201°F, PMCC
Finish:	35-45 units @ 60°
Solvent/Reducer:	Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
BaseA, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type:	Acrylic
VOC (as packaged):	132-156 g/l less water ~~132~~ ~~grams/liter~~; ~~1.06 lbs/~~gal
Volume Solids:	33 ± 2%
Weight Solids:	44 ± 2%
Weight per Gallon:	10.0 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Gloss Latex

Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Gloss Latex

Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. A-100 Exterior Gloss Latex

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex

Galvanized Steel
2 cts. A-100 Exterior Gloss Latex

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Gloss Latex

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex

Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. A-100 Exterior Gloss Latex

Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Gloss Latex

Vinyl Siding
2 cts. A-100 Exterior Gloss Latex

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Gloss Latex

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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SHERWIN WILLIAMS

A-100®

EXTERIOR GLOSS LATEX
A8 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.019" - .021"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS

A8W16

Pigment by Weight	19%
Titanium Dioxide	17%
Zinc Oxide	2%
Vehicle by Weight	81%
Acrylic Resin	23%
Water	52%
Glycol/Alcohol/Esters	4%
Mildewcide	0.2%
Additives	1.8%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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Duration™
EXTERIOR LATEX FLAT COATING
K32 SERIES

DESCRIPTION

Duration™ Exterior Latex Coating is the result of advances in acrylic technology. **Duration** uses **PermaLast™** technology to provide you with the most durable and longest lasting coating available for protecting the outside of your home.

Performance

- One Coat Protection
- Self-Priming
- Easy Application
- Superior Hiding
- Thicker. More Flexible
- Resists Blistering and Peeling

Projects

- Homes
- Windows
- Gutters
- Trim
- Architectural plastics, such as shutters & gutters

Surfaces

- Wood
- Stucco
- Masonry/Cement Composition Panels
- Aluminum Siding
- Vinyl Siding
- Galvanized Metal

MILDEW RESISTANT. This coating contains agents that inhibit the growth of mildew on the surface of this coating.

CHARACTERISTICS

Color:	all ColorAnswers® colors
Coverage:	
Recommended:	250-300 sq ft/gal up to 7.0 mils wet; 2.8 mils dft
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent	
Touch:	1 hour
Recoat:	4 hours
Flash Point:	201°F, PMCC
Finish:	0-5 units @ 85°
Solvent/Reducer:	Water

Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-5	125%
Base A, B, C	5-10	125%
Burgundy	5-10	125%

Vehicle Type:	Acrylic
VOC:	109 grams/liter; 0.91 lb/gal
Volume Solids:	40 ± 2%
Weight Solids:	58 ± 2%
Weight per Gallon:	11.8 lb

APPLICATION

Thoroughly follow the recommended surface preparations. On repaint work, apply one coat of **DURATION** coating; on bare surfaces, apply two coats of **DURATION**, allowing 4 hours drying between coats.

Apply using a brush, roller, or sprayer. Thinning not normally required. Do not paint in direct sun. Apply at temperatures above 50°F. During application at temperatures above 80°F, **DURATION** sets up quickly. Some adjustment in your painting approach may be required. Paint from a dry area into the adjoining wet coating area. Dries to touch in 1 hour and is ready for service overnight.

Previously Painted Surfaces — Spot prime bare areas with **DURATION**, wait 4 hours, and paint the entire surface. Some specific surfaces require specialized treatment.

Unpainted Surfaces — **DURATION** can be used as a self-priming coating on many bare surfaces. When used this way, the first coat of **DURATION** acts like a coat of primer and the second coat provides the final appearance and performance. However, some specific surfaces require specialized treatment.

See following surface preparations.

No reduction necessary.

Brush - Use a nylon/polyester brush.

Roller - Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

CLEANUP INFORMATION

Clean hands and tools ***immediately*** after use with soap and warm water. The ***PermaLast*** technology in **DURATION** coating, which creates the tenacious bond to the surface, also creates a tenacious bond to applicators and any other surface it comes in contact with. You may want to clean occasionally during use. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

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Duration™

EXTERIOR LATEX FLAT COATING
K32 SERIES

SURFACE PREPARATION

Most coating failures are due to inadequate surface preparation or application. Thorough surface preparation will help provide long term protection with DURATION coating.

Remove all surface contamination, including mildew and chalk, by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Scrape and sand existing peeled or cracked paint to a sound surface. Remove any oil or grease with a water-based degreasing cleaner. Sand glossy surfaces dull. All rust must be removed. Seal stains from water, smoke, graffiti, grease, etc. with PrepRite ProBlock Primer/Sealer.

Caulking—After cleaning the surface thoroughly, caulk around windows, doors, and other openings with Sherwin-Williams Exterior Caulk after spot priming any bare surfaces in these areas with **DURATION** or other appropriate primer.

Aluminum and Galvanized Steel - Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method. After cleaning any corrosion from galvanized steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** to the cleaned area.

Cement Composition Siding/Panels - Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. If the surface is new, test it for pH, if the pH is higher than 8, prime with **Loxon® Exterior Masonry Primer**.

Cement, Concrete, Masonry, Block - All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with **Loxon Exterior Acrylic Masonry Primer**. If a smoother finish is desired on rough surfaces, use Loxon **Block Surfacer or PrepRite Block Filler**. After power washing, previously painted masonry may still have a powdery surface that should be sealed with **Loxon Conditioner** and then apply 1 coat of **DURATION**.

Composition Board/Hardboard — Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Because of the potential for wax bleeding out of the substrate, we recommend 1 coat of **A-100® Exterior Oil Primer** and then 1 coat of **DURATION.**

Exterior Drywall - Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Steel - Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. To prevent surface rusting on bare steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** and then 1 coat of **DURATION**.

Stucco - Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with **Loxon Exterior Masonry Acrylic Primer**.

Vinyl Siding - Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color. Painting with darker colors may cause the siding to warp.

Wood - Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Knots and some woods, such as redwood and cedar, contain a high amount of tannin, a colored wood extract. If applied to these bare woods, the first coat of **DURATION** may show some staining, but it will be trapped in the first coat. A second coat will uniform the appearance. If staining persists, spot prime severe areas with 1 coat of **A-100 Exterior Oil Wood Primer** prior to using **DURATION**.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F .
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains ANTIMONY and ZINC.
Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY.
KEEP OUT OF THE REACH OF CHILDREN.
Do not apply on toys and other children's articles or furniture.
11/98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

ATTACHMENT 13 page 1 102.14

Duration™

EXTERIOR LATEX SATIN COATING
K33 SERIES

DESCRIPTION

DURATION™ Exterior Latex Coating is the result of advances in acrylic technology. **DURATION** uses **PermaLast™** technology to provide you with the most durable and longest lasting coating available for protecting the outside of your home.

Performance

- One Coat Protection
- Self-Priming
- Easy Application
- Superior Hiding
- Thicker. More Flexible
- Resists Blistering and Peeling

Projects

- Homes
- Windows
- Gutters
- Trim
- Architectural plastics, such as shutters & gutters

Surfaces

- Wood
- Stucco
- Masonry/Cement Composition Panels
- Aluminum Siding
- Vinyl Siding
- Galvanized Metal

MILDEW RESISTANT. This coating contains agents that inhibit the growth of mildew on the surface of this coating.

CHARACTERISTICS

Color: all ColorAnswers® colors

Coverage:

Recommended: 250-300 sq ft/gal up to 7.0 mils wet; 2.8 mils dft

Drying Time, @ 77°F, 50% RH: temperature and humidity dependent

Touch: 1 hour

Recoat: 4 hours

Flash Point: 201°F, PMCC

Finish: 10-20 units @ 60°

Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-5	125%
Base A, B, C	5-10	125%
Burgundy	5-10	125%

Vehicle Type: Acrylic

VOC: 68-120 ~~97~~ grams/liter less water; 0~~.80 lbs/gal~~

Volume Solids: 40 ± 2%

Weight Solids: 55 ± 2%

Weight per Gallon: 10.9 lb

APPLICATION

Thoroughly follow the recommended surface preparations. On repaint work, apply one coat of **DURATION** coating; on bare surfaces, apply two coats of **DURATION**, allowing 4 hours drying between coats.

Apply using a brush, roller, or sprayer. Thinning not normally required. Do not paint in direct sun. Apply at temperatures above 50°F. During application at temperatures above 80°F, **DURATION** sets up quickly. Some adjustment in your painting approach may be required. Paint from a dry area into the adjoining wet coating area. Dries to touch in 1 hour and is ready for service overnight.

Previously Painted Surfaces — Spot prime bare areas with **DURATION**, wait 4 hours, and paint the entire surface. Some specific surfaces require specialized treatment.

Unpainted Surfaces — **DURATION** can be used as a self-priming coating on many bare surfaces. When used this way, the first coat of **DURATION** acts like a coat of primer and the second coat provides the final appearance and performance. However, some specific surfaces require specialized treatment.

See following surface preparations.

No reduction necessary.

Brush - Use a nylon/polyester brush.

Roller - Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure .... 2000 psi

Tip .... .015"-.019"

Reduction .... none

CLEANUP INFORMATION

Clean hands and tools ***immediately*** after use with soap and warm water. The ***PermaLast*** technology in **DURATION**, which creates the tenacious bond to the surface, also creates a tenacious bond to applicators and any other surface it comes in contact with. You may want to clean occasionally during use.

After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

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102.14 **ATTACHMENT 13** **page 2**

Duration™

EXTERIOR LATEX SATIN COATING

K33 SERIES

SURFACE PREPARATION

Most coating failures are due to inadequate surface preparation or application. Thorough surface preparation will help provide long term protection with DURATION coating.

Remove all surface contamination, including mildew and chalk, by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Scrape and sand existing peeled or cracked paint to a sound surface. Remove any oil or grease with a water-based degreasing cleaner. Sand glossy surfaces dull. All rust must be removed. Seal stains from water, smoke, graffiti, grease, etc. with PrepRite ProBlock Primer/Sealer.

Caulking—After cleaning the surface thoroughly, caulk around windows, doors, and other openings with Sherwin-Williams Exterior Caulk after spot priming any bare surfaces in these areas with **DURATION** or other appropriate primer.

Aluminum and Galvanized Steel - Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method. After cleaning any corrosion from galvanized steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** to the cleaned area.

Cement Composition Siding/Panels - Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. If the surface is new, test it for pH, if the pH is higher than 8, prime with **Loxon® Exterior Masonry Primer**.

Cement, Concrete, Masonry, Block - All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with **Loxon Exterior Acrylic Masonry Primer**. If a smoother finish is desired on rough surfaces, use Loxon **Block Surfacer or PrepRite Block Filler**. After power washing, previously painted masonry may still have a powdery surface that should be sealed with **Loxon Conditioner** and then apply 1 coat of **DURATION**.

Composition Board/Hardboard — Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Because of the potential for wax bleeding out of the substrate, we recommend 1 coat of **A-100® Exterior Oil Primer** and then 1 coat of **DURATION.**

Exterior Drywall - Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Steel - Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. To prevent surface rusting on bare steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** and then 1 coat of **DURATION**.

Stucco - Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with **Loxon Exterior Masonry Acrylic Primer**.

Vinyl Siding - Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color. Painting with darker colors may cause the siding to warp.

Wood - Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Knots and some woods, such as redwood and cedar, contain a high amount of tannin, a colored wood extract. If applied to these bare woods, the first coat of **DURATION** may show some staining, but it will be trapped in the first coat. A second coat will uniform the appearance. If staining persists, spot prime severe areas with 1 coat of **A-100 Exterior Oil Wood Primer** prior to using DURATION.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50° .
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains ANTIMONY and ZINC.
Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY.
KEEP OUT OF THE REACH OF CHILDREN.
Do not apply on toys and other children's articles or furniture.
11/98

ATTACHMENT 14 page 1

102.01

SUPERPAINT®
EXTERIOR LATEX FLAT
A80 SERIES

CHARACTERISTICS

SuperPaint Exterior Latex Flat is our finest quality exterior flat finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @ 4.0 mils wet; 1.4 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Flat
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (less exempt solvents):
139 grams/liter; 1.16 lb/gal
Volume Solids: 34 ± 2%
Weight Solids: 51 ± 2%
Weight per Gallon: 11.2 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:

TT-P-19D
TT-P-96D (cancelled spec)
TT-P-1510A (cancelled spec)
TT-E-2784A, Type III

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. SuperPaint Exterior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. SuperPaint Exterior Latex Flat
Brick
1 ct. Loxon Conditioner
2 cts. SuperPaint Exterior Latex Flat
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Flat
Galvanized Steel
2 cts. SuperPaint Exterior Latex Flat
Masonry/Cement/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior Latex Flat
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Flat
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. SuperPaint Exterior Latex Flat
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior Latex Flat
Vinyl Siding
2 cts. SuperPaint Exterior Latex Flat
Wood, Composition Board
1 ct. A-100 Alkyd Exterior Wood Primer
2 cts. SuperPaint Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum and Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick
All brick must weather at least one year followed by wire brushing to remove all efflorescence. Prime the surface with one coat of Masonry Conditioner.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Ext. Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Continued on back

SUPERPAINT®
EXTERIOR LATEX FLAT
A80 SERIES

SURFACE PREPARATION

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Masonry Acrylic Primer.

Vinyl Siding
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS
A80W507

Pigment by Weight	35%
Titanium Dioxide	19%
Zinc Oxide	2%
Silica/Silicates	14%
Vehicle by Weight	65%
Acrylic Resin	14%
Water	45%
Glycols/Alcohols/Esters	4%
Mildewcide	0.3%
Additives	1.7%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98 6/98

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ATTACHMENT 15 page 1

102.10

SUPERPAINT®

EXTERIOR LATEX SATIN
A89 SERIES

CHARACTERISTICS

SuperPaint Exterior Latex Satin is our finest quality exterior satin finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors

Coverage:

Recommended: 400 sq ft/gal @4 mils wet; 1.44 mils dry

Drying Time, @ 77°F 50% RH:
temperature and humidity dependent

Touch: 1 hour

Recoat: 4 hours

Flash Point: 201°F, PMCC

at **Finish:** 10-20 units @ 85°

Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic

VOC (less exempt solvents):
110 grams/liter; 0.92 lb/gal

Volume Solids: 36 ± 2%

Weight Solids: 50 ± 2%

Weight per Gallon: 10.5 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:

TT-P-19D
TT-P-96D (cancelled spec)
TT-P-1510A (cancelled spec)

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. SuperPaint Exterior Latex Satin

Block
1 ct. PrepRite Block Filler
2 cts. SuperPaint Exterior Latex Satin

Brick
1 ct. Loxon Conditioner
2 cts. SuperPaint Exterior Latex Satin

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Satin

Galvanized Steel
2 cts. SuperPaint Exterior Latex Satin

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior Latex Satin

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Satin

Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. SuperPaint Exterior Latex Satin

Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior Latex Satin

Vinyl Siding
2 cts. SuperPaint Exterior Latex Satin

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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SHERWIN WILLIAMS

SUPERPAINT®
EXTERIOR LATEX SATIN
A89 SERIES

SURFACE PREPARATION

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
Use a nylon/polyester brush.

Roller
Use a 3/8" - 3/4" nap synthetic roller cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.017"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	10-20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A89W507

Pigment by Weight	25%
Titanium Dioxide	20%
Zinc Oxide	2%
Silica/Silicates	3%
Vehicle by Weight	75%
Acrylic Resin	22%
Water	46%
Additives	7%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98 6/98

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ATTACHMENT 16 page 1

102.20

SHERWIN WILLIAMS

SUPERPAINT®

EXTERIOR GLOSS LATEX

A84 SERIES

CHARACTERISTICS

SuperPaint Exterior Gloss Latex is our finest quality exterior gloss finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.4 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 24 hours
Flash Point: 201°F, PMCC
Finish: 35-45 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (as packaged): 120 - 156 (less water) ~~51~~ grams/liter; ~~0.43 lbs/gal~~
Volume Solids: 36 ± 2%
Weight Solids: 48 ± 2%
Weight per Gallon: 10.3 lbs

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. SuperPaint Exterior Gloss Latex
Block
1 ct. PrepRite Block Filler
2 cts. SuperPaint Exterior Gloss Latex
Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. SuperPaint Exterior Gloss Latex
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Gloss Latex
Galvanized Steel
2 cts. SuperPaint Exterior Gloss Latex
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior Gloss Latex
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Gloss Latex
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. SuperPaint Exterior Gloss Latex
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior Gloss Latex
Vinyl Siding
2 cts. SuperPaint Exterior Gloss Latex
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior Gloss Latex

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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SUPERPAINT®
EXTERIOR GLOSS LATEX
A84 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A84W507

Pigment by Weight	21%
Titanium Dioxide	19%
Zinc Oxide	2%
Vehicle by Weight	79%
Acrylic Resin	24%
Water	47%
Glycols/Alcohols/Esters	3%
Mildewcide	0.3%
Additives	4.7%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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102.22

ATTACHMENT 17 page 1

SUPERPAINT®
EXTERIOR HIGH GLOSS LATEX ENAMEL
A85 SERIES

CHARACTERISTICS

SuperPaint Latex High Gloss Enamel

Recommended for:
- Doors
- Windows
- Trim
- Shutters

Use on:
- Wood
- Metal—Aluminum, Galvanized, Primed Steel
- Masonry, Cement, Brick, Block
- Stucco
- Vinyl trim, Shutters

Superior Performance in:
- Block Resistance
- Moisture Resistance
- Gloss Retention
- Flow and Leveling

Color: All exterior ColorAnswers colors

Coverage: 400 sq ft/gal @4 mils wet: 1.32 mils dry

Drying Time, @77°F, 50% RH: temperature and humidity dependent

Touch:	1 hour
Tack Free:	4 hours
Recoat:	24 hours

Flash Point: 201°F, PMCC

Finish: 70+ units @ 60°

Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Red Base	4-8	100%
Neutral Base	8-12	100%
Package colors	0-4	not controlled

Vehicle Type: Acrylic

VOC (less exempt solvents): 110-132 (less water) ~~118~~ grams/liter; ~~0.98 lbs/gal~~

Volume Solids: 43 ± 2%

Weight Solids: 54 ± 2%

Weight per Gallon: 10.3 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification: TT-E-2784A, Type I, Gloss

SPECIFICATIONS

Aluminum
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Vinyl
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and nail holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned.

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

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ATTACHMENT 17 page 2

SUPERPAINT®

EXTERIOR HIGH GLOSS LATEX ENAMEL

A85 SERIES

SURFACE PREPARATION

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew - Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS

A85W507

Pigment by Weight	15%
Titanium Dioxide	15%
Vehicle by Weight	85%
Acrylic Resin	48%
Styrene Acrylic	6%
Water	24%
Glycol	4%
Additives	3%
Total	100%

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8"-1/2" SherFab roller cover.
Spray—Airless

Pressure	2000 psi
Tip	.013"-.017"
Reduction	none

SuperPaint High Gloss Enamel sets up very quickly, providing painted surfaces which resists sticking together (blocking). When used at normal temperature and humidity, windows and doors can be closed after 4 hours drying. Maximum blocking resistance is achieved after 24 hours. With this benefit, some adjustments to your painting approach must be made.

- Do not paint in direct sun. Temperatures over 80°F and humidities under 30% will make the paint set up quicker.
- Do not over-work the product. Load paint on the surface, spread to cover, smooth out with long, even strokes. Finish this area before moving to a new area. Do not attempt to brush back into and further uniform an area once finished.
- Work quickly to maintain a wet edge.
- Paint objects in a vertical position to reduce the collection of airborne dirt and dust on the drying paint.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.
Do not shake excessively.
Not for use on roofs, floors, or decks.
Do not use Red, Yellow, or Violet Blend-A-Color Toner for exterior use.

LABEL CAUTION

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB528-4/98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

102.04

SHERWIN WILLIAMS

ATTACHMENT 18 page 1

TOUGH ONE®
EXTERIOR LATEX FLAT
C1 SERIES

CHARACTERISTICS

Tough One Exterior Latex Flat is an economical finish for residential use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: Many ColorAnswers colors
Coverage:
Recommended: 400 sq ft/gal @ 4 mils wet; 1.0 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
lat → **Finish:** 0-10 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
White	0-4	not controlled

Vehicle Type: Acrylic
VOC: 43 grams/liter; 0.36 lb/gal
Volume Solids: 25 ± 2%
Weight Solids: 41 ± 2%
Weight per Gallon: 10.5 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. Tough One Exterior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. Tough One Exterior Latex Flat
Brick
1 ct. Loxon Conditioner
2 cts. Tough One Exterior Latex Flat
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. Tough One Exterior Latex Flat
Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. Tough One Exterior Latex Flat
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. Tough One Exterior Latex Flat
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. Tough One Exterior Latex Flat
Steel, alkyd primer
1 ct. All Surface Enamel Oil Primer
2 cts. Tough One Exterior Latex Flat
Steel, latex primer
1 ct. All Surface Enamel Latex Primer
2 cts. Tough One Exterior Latex Flat
Vinyl Siding
2 cts. Tough One Exterior Latex Flat
Wood, Composition Board
1 ct. WeatherPerfect Alkyd Exterior Undercoater
2 cts. Tough One Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Brick
All brick must weather at least one year followed by wire brushing to remove all efflorescence. Prime the surface with one coat of Loxon Conditioner.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Ext. Acrylic Masonry Primer. Repair cracks, voids, and other holes using ConSeal Patches and Sealants.

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TOUGH ONE®

EXTERIOR LATEX FLAT

C1 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Masonry Acrylic Primer.

Vinyl Siding
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.

Brush
Use a nylon/polyester brush.

Roller
Use a 3/8" - 3/4" nap synthetic roller cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS

C1W502

Pigment by Weight	29%
Titanium Dioxide	9%
Zinc Oxide	1%
Silica/Silicates	19%
Vehicle by Weight	71%
Acrylic Resin	8%
Water	58%
Soya Alkyd	1%
Mildewcide	0.1%
Additives	3.9%
Total	100%

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA
Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB366 4/99
25 00

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

WEATHERPERFECT®
EXTERIOR LATEX FLAT
B36 SERIES

CHARACTERISTICS

WeatherPerfect Exterior Latex Flat House & Trim is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.3 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Flat — Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%
Yellow Corn	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Vinyl Acrylic
VOC (as packaged): 110-120 g/l less water ~~42 grams/liter; 0.35 lbs/gal~~
Volume Solids: 32 ± 2%
Weight Solids: 48 ± 2%
Weight per Gallon: 10.8 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:

TT-P-19D
TT-P-96D
TT-P-1510A

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. WeatherPerfect Exterior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. WeatherPerfect Exterior Latex Flat
Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. WeatherPerfect Exterior Latex Flat
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Flat
Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. WeatherPerfect Exterior Latex Flat
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. WeatherPerfect Exterior Latex Flat
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Flat
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. WeatherPerfect Exterior Latex Flat
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. WeatherPerfect Exterior Latex Flat
Vinyl Siding
2 cts. WeatherPerfect Exterior Latex Flat
Wood, Composition Board
1 ct. WeatherPerfect Alkyd Exterior Undercoater
2 cts. WeatherPerfect Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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WEATHERPERFECT®
EXTERIOR LATEX FLAT
B36 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush

No reduction necessary. Use a nylon/polyester brush.

Roller

No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad

No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
B36W306

Pigment by Weight	33%
Titanium Dioxide	19%
Zinc Oxide	1%
Silica/Silicates	13%
Vehicle by Weight	67%
Vinyl/Acrylic Polymer	12%
Water	48%
Mildewcide	0.1%
Glycol	2%
Additives	4.9%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

GB98

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ATTACHMENT 20 page 1

102.12

SHERWIN WILLIAMS

WEATHERPERFECT®
EXTERIOR LATEX SATIN
B77 SERIES

CHARACTERISTICS

WeatherPerfect Exterior Latex Satin is a quality satin finish recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All ColorAnswers® colors

Coverage:

Recommended: 400 sq ft/gal @4 mils wet; 1.4 mils dry

Drying Time, @77°F, 50% RH: temperature and humidity dependent

Touch: 1 hour

Recoat: 24 hours

Flash Point: 201°F, PMCC

AT → Finish: 10-20 units @ 85°

Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%
White	0-4	not controlled

Vehicle Type: Vinyl Acrylic

VOC (as packaged): 110-120 g/l less water ~~42 grams/liter; 0.35 lbs/gal~~

Volume Solids: 34 ± 2%

Weight Solids: 47 ± 2%

Weight per Gallon: 10.4 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. WeatherPerfect Exterior Latex Satin

Block
1 ct. PrepRite Block Filler
2 cts. WeatherPerfect Exterior Latex Satin

Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. WeatherPerfect Exterior Latex Satin

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Satin

Galvanized Steel
2 cts. WeatherPerfect Exterior Latex Satin

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. WeatherPerfect Exterior Latex Satin

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Satin

Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. WeatherPerfect Exterior Latex Satin

Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. WeatherPerfect Exterior Latex Satin

Vinyl Siding
2 cts. WeatherPerfect Exterior Latex Satin

Wood, Composition Board
1 ct. WeatherPerfect Alkyd Exterior Undercoater
2 cts. WeatherPerfect Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Continued on back

WEATHERPERFECT®
EXTERIOR LATEX SATIN
B77 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.019" - .021"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
B77W506

Pigment by Weight	25%	
Titanium Dioxide		19%
Zinc Oxide		1%
Silica/Silicates		5%
Vehicle by Weight	75%	
Vinyl/Acrylic Polymer		15%
Water		50%
Glycols/Alcohols/Esters		3%
Mildewcide		0.1%
Additives		6.9%
Total	100%	

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS

Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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SHERWIN WILLIAMS

LOWTEMP 35™
EXTERIOR LATEX SATIN
B17 SERIES

CHARACTERISTICS

LowTemp 35 Exterior Latex Satin is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time @ 50% RH:
temperature and humidity dependent

	@ 35-45°F	@ 45-60°F
Touch:	2 hours	2 hours
Recoat:	48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.

Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic
B17W410
VOC: 102 grams/liter; 0.85 lb/gal
Volume Solids: 35 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.3 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate	**Primer**
Aluminum[1]	no primer necessary
Block	Loxon Block Surfacer
Brick	Masonry Conditioner or ProMar Masonry Conditioner
Exterior Drywall	LowTemp 35 Exterior Latex Primer
Galvanized Steel[1]	no primer necessary
Masonry/Cement/Stucco	LowTemp 35 Exterior Latex Primer Loxon Ext. Acrylic Masonry Primer[2]
Plywood	LowTemp 35 Exterior Latex Primer
Preprimed Metal Siding[1]	DTM Bonding Primer[2]
Steel, alkyd primer[1]	All Surface Enamel Oil Primer
Steel, latex primer[1]	All Surface Enamel Latex Primer[2]
Vinyl Siding	no primer necessary
Wood, Composition Board	LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.

[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.
Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

continued on back

LowTemp 35™

Exterior Latex Satin

B17 Series

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.
No reduction necessary.

Brush
Use a nylon/polyester brush.

Roller
Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless
Pressure .... 2000 psi
Tip .... .015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.
Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.
On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS

CAUTION contains CRYSTALLINE SILICA and ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
LCE 9/22/99
04 00

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

LOWTEMP 35™
EXTERIOR LATEX FLAT
B15 SERIES

CHARACTERISTICS

LowTemp 35 Exterior Latex Flat is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @4 mils wet; 1.5 mils dry
Drying Time @ 50% RH:
temperature and humidity dependent

	@ 35-45°F	**@ 45-60°F**
Touch:	2 hour	2 hours
Recoat:	24-48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.
Flash Point: 201°F, PMCC
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	**oz/gal**	**Strength**
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic
B15W210
VOC: 129 grams/liter; 1.08 lb/gal
Volume Solids: 40 ± 2%
Weight Solids: 57 ± 2%
Weight per Gallon: 11.7 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-E-2784A, Type III

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate	**Primer**
Aluminum[1]	no primer necessary
Block	Loxon Block Surfacer
Brick	Masonry Conditioner or ProMar Masonry Conditioner
Exterior Drywall	LowTemp 35 Exterior Latex Primer
Galvanized Steel[1]	no primer necessary
Masonry/Cement/Stucco	LowTemp 35 Exterior Latex Primer Loxon Ext. Acrylic Masonry Primer[2]
Plywood	LowTemp 35 Exterior Latex Primer
Preprimed Metal Siding[1]	DTM Bonding Primer[2]
Steel, alkyd primer[1]	All Surface Enamel Oil Primer
Steel, latex primer[1]	All Surface Enamel Latex Primer[2]
Vinyl Siding	no primer necessary
Wood, Composition Board	LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.
[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.
Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

continued on back

ATTACHMENT 22 page 2

SHERWIN WILLIAMS

LOWTEMP 35™

EXTERIOR LATEX FLAT
B15 SERIES

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.

No reduction necessary.

Brush

Use a nylon/polyester brush.

Roller

Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS
B15W296

Pigment by Weight	37%
Titanium Dioxide	13%
Silicates	22%
Zinc Oxide	2%
Vehicle by Weight	63%
Acrylic Polymer	15%
Water	41%
Glycol/Esters	4%
Additives	3%
Total	100%

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.
Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.
On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS

CAUTION contains ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

LCE 9/20/99
06 00

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Rust-Oleum Corporation
PO Box 581906 • Pleasant Prairie, WI 53158-0906 • 262-947-7220 • FAX 262-947-6855

RUST-OLEUM CORPORATION

Shipping Address:
8105 Fergusson Drive
Pleasant Prairie, WI 53158

March 31, 2000

Ms. Janette Brooks
Chief, Stationary Source Division
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Dear Janette:

Thank you for inviting me to provide a written record of my comments at the recent AIM SCM Workshop. I look forward to following up with you on these comments either on the afternoon of 4/11/00 or the morning of 4/12/00.

Comments made at 3/16/00 CARB AIM SCM Workshop and,
Comments on the Draft EIR and the documentary record supporting it.
By Duane DeYoung, Vice President of R&D, Rust-Oleum Corp. (draft 3/28/00)

As Vice President of R&D, and Technical Director for Coatings Development at Rust-Oleum, I bring extensive experience in Industrial Maintenance Coatings, including rust preventive brush and spray products, water based IM coatings, and high performance IM coatings. In addition, I have worked for years in the area of Trade Sales Architectural Coatings and in the area of water borne industrial finishes. With over 26 years of experience in coatings R&D, plus another 8 years of experience working in the chemical industries which supply materials to the coatings industry, I am well qualified to comment upon the technical issues contained in CARB's proposed Suggested Control Measure for Architectural Coatings. My comments below will concentrate on the IM category.

First, the singular VOC limit of 250g/L for the IM category is seriously flawed from a performance standpoint, because IM coating is NOT a monolithic, single use category, but spans a range from light duty IM uses to extremely heavy duty IM uses that address the requirements of protection in very specific industries and exposure situations. To expect that the needs of all IM areas can be met by one low limit is unrealistic. 10-1

What will be the predicted impacts on the varying segments of the IM category?

-2 For Light Duty users and end uses, where non-professional, ad hoc painting of IM surfaces occurs on a routine basis, but where the substrates are forgiving, and the exposure conditions mild, the standard alkyd enamel coating tool will be lost, but can be replaced by water based latex IM enamels at < 250VOC. For these situations where low labor input, air drying and quick return to service issues are paramount, the impact will

10-2 be to move from easy, low cost alkyd protection to slightly less easy, higher cost latex protection. Surface condition preparation will be more critical, and the temperature/humidity window for good application will be narrower, but the coating performance will be adequate.

10-3 Moderate Duty IM coatings users will suffer the biggest negative impact. These users are, again, usually non professional painters (not contractors) who are doing crucial regular maintenance of surfaces with more severe exposures to impact, abrasion, chemical contact, moisture, and temporary immersion. These surfaces represent the vast range of the industrial infrastructure of this country, ranging from production equipment, machines, tanks, reactors, decks and railings. These surfaces extend into the public service sector as well. In this area of the IM category, single component alkyd enamels reigned supreme in their ability to be substrate tolerant, easy to apply, and very protective in these moderate exposure conditions. For most of these uses the water based acrylic latex enamels will NOT be sufficient to protect this crucial infrastructure. These non-professional painters will need to turn to 2 component systems (epoxies and urethanes) which are inherently more difficult to handle and apply, and may not be suited to all of the surfaces that need protection. Consequently, the impact will be to move from a low cost solution to a complex, high cost coating. That coating will be more difficult to apply, will be easier to mis-apply, and will result in either MORE coating used to redo jobs, or LESS frequent painting and protection of these surfaces. Both results are counter- productive to these users. In addition, small uses of 2K coatings will result in more coatings waste as the unused portion of an activated coating cannot be saved and must be discarded.

10-4 The heavy duty IM area of the category is probably best served by existing 2K, 100% solids, plural component sprayed coatings systems that are applied by professional contractors using expensive, specialized spray equipment. Here the impact will be from high cost to HIGHER cost as VOC are ratcheted downward.

10-5 Second, the VOC limit of 250g/L for the IM category is flawed because many of the coatings presented as "effective, compliant" technology have been tested by various Public Service Agencies (Metropolitan Water District of Southern California, California DOT, County Sanitation Districts of LA County, California Department of Water Resources) and have been found to be deficient in the areas of durability and performance. These public utilities have been granted extensions in SCAQMD to find coatings that comply, thus indicating that there ARE serious doubts as to the "proof of concept" that compliant, EFFECTIVE coatings are ready to be used. This doubt is further exemplified by the extension of the IM limit enforcement from 7/1/2002 to 1/1/2004. Clearly CARB has seen this flaw in its own reasoning, otherwise it would not be acceding to the concerns of CA public utilities, nor would it be allowing industry an additional year to catch up the reality to the flawed expectation of readiness. The CARB response (comment #17-1) to essential public service providers that "Based on review, we conclude coatings... are available and that such complying coatings perform <u>as well</u> as higher VOC IM coatings" is simply untrue after my review of the record. (See following section) such a CARB response demands detailed proof of validity, and I challenge CARB to do so.

10-6 Third, the CARB staff has NOT developed a factual, scientific record of actually tested, EFFECTIVE solutions to many of the IM needs. The NTS study did not adequately or scientifically compare long term protection/durability performance of high vs. low VOC coatings, choosing instead to rely on initially observable, but relatively insignificant properties of the few coatings tested.. Instead, the record shows that the staff has relied on unproven product literature claims, RM supplier claims which are unsubstantiated, and overblown promotional product literature of questionable veracity. The record, as referenced below demonstrates a misunderstanding of REAL IM coatings and applications.

10-7 Examples of flawed records:

a. Referencing dubious products having weak claims, erroneous claims, and depending on marketing puffery to persuade unknowledgeable audience. Goes to lack of credibility.

10-8 Example IM p.152: Imprecise Salt Spray data; overblown rhetoric, erroneous claim of non-carcinogenic asphault based coating.

10-9 Example IM p.259: "VOC= 70 degree @ 60 degree angle".

-10 Example IM p.263: "waterborne moisture cure polyurethane coating" (chemically impossible.

10-11 b. Dependence on Supplier starting point formulae to demonstrate feasible technology. Such "starting point" formulae rarely, if ever, work. Nor do supplier claims of performance always come true when subjected to scientific verification. Such data sheets are NOT indicative of 'real' commercial technology, and cannot be relied upon to demonstrate that claim.
Examples: IM p. 182, 205, 206, 207, 208, 209,

10-12 c. Waterborne Coatings deficiencies
Acrylics: Need for primer over metal, immersion limitations
Example IM p. 183

10-13 2K Epoxies: Need for primer over steel and concrete; pot life; T/H limitations
Example: IM p.247

10-14 2K Urethanes: Pot life and shelf life limitations
Example IM p. 310, and RO personal experience with the technology limitations

10-15 Carcinogenic performance enhancers: aziridine as a cross-linker
Example: IM p. 198

10-16 d. Coatings limited to special use and/or specialized application equipment
(i.e. coatings NOT for general purpose Lt. – Mod. Duty IM.)
Tank Linings using special spray equipment
Example IM p.203

10-17 Heat Cured linings requiring extended cure time at high temps.
Example IM p. 228, 230, 231, 232, 234, 240, 241, 243, 244, 245

10-18 e. Coatings requiring extremely specialized application equipment.
(i.e. NOT for GP IM use)
Plural component heated airless spray
Example: IM p. 251

10-19 Gel time of 5 seconds
Example: IM p. 297

10-20 f. Dependence on "technical" articles by suppliers. This begs the issue of conflict of interest, and should not be depended on to "validate" technology that has not been tested thoroughly.
Example: IM p. 320-321

10-21 Suggestions for changes to the SCM:

1. Unify CARB's SCM with the coatings categories and limits used in the USEPA AIM Regulation.
2. 10-22 Segregate IM into REAL use categories, and set limits based upon proven, fully tested technology.
3. 10-23 Consider IM category averaging to allow higher VOC's for Lt-Moderate duty coatings, and lower VOC's for super High Performance specialty uses. (i.e. 340 VOC alkyds for certain uses down to <100 VOC epoxies could net out at 250VOC for the category)

10-24 I shall be in Sacramento on April 11th an 12th of this month and would welcome the opportunity to meet with you to expand on these comments. I also am requesting a response at that time which validates your conclusion #17-1 in the comment section. I believe that an appropriate validation would be for you to share the specific testing done by CARB to prove the worth of coatings which essential public services contends are not currently available. Please call me should you have any questions, and to schedule an appointment.

Sincerely,

Duane DeYoung
Vice President R&D

cc: Peter Venturini - CARB
Barbara Fry – CARB
Jim Nyardy – CARB
Bob Nelson – NPCA
Mike Murphy
Mike Tellor

[illegible]

Weak Claims
Erroneous Claims
Marketing Puffery

Filling the Void
Summary of Physical Properties

as tested by PRI, Asphalt Technologies Inc.

SHELF LIFE	*Indefinite once properly covered/sealed.*
DENSITY OF PRODUCT	*4.1595 lb/gal.*
SOLIDS CONTENT	*77.9% (by wt.), 50% (by vol.).*
FLASH POINT	*188°F/86.67°C (ASTM D92 (COC)).* *201°F/93.89°C (ASTM D93 (Pensky Marten)).*
BINDER CONTENT	*80%.*
SOLVENT	*20%.*
FINISH	*Gloss/semi-gloss.*
COLOUR	*Can be pigmented to any colour.*
COVERAGE	*88 square feet per gallon.*
DRYING TIME	*Touch dry: 5 hours. Hard dry: 9 hours.* *Can be re-coated after 6 hours.*
MIXING RATIO	*3:1 base to catalyst (as supplied).*
NUMBER OF COATS	*One 8 mils coat.*
APPLICATION	*Brush or spray.*
PRIMING	*Standard epoxy primers if required.*
POT LIFE	*3 hours at ambient temperature.*
SALT SPRAY	*No deterioration of panels.*
IMMERSION IN SOUR CRUDE	*No penetration or loss of adhesion.*
CLEAN UP	*Vinegar immediately after use.*
TEMPERATURE RESISTANCE HIGH	*No change at 250°F/121°C.*
TEMPERATURE RESISTANCE LOW	*-22°F/-30°C.*
COMBUSTIBILITY	*Does not support a flame.*

F-M 152

Inventing the Future

Natural Rubberised ECO Coatings for the 21st Century

Man desires to step forward, but he stands on the brink of a void. As we take that giant leap into the twenty first century, new mandates and requirements assail us: products must do more., do it better, do it cost-effectively, and must now also do it safely as the plant itself is at stake.

But what are the options?

Let us take a look at our present situation.

There are also vinyl, alkyd and epoxy based coatings which are unsatisfactory as they require harmful anti-fouling agents when used in a marine environment; and a handful of eco-friendly coatings which are unsatisfactory because their physical properties are inferior.

Dolly Nicholas – Asphalt Products Trinidad Limited

But what is the solution?

To fill the void created by these unsatisfactory coatings. Asphalt Products Trinidad Limited (APTL) has researched and developed the only natural, rubberised, non-carcinogenic, eco-friendly coatings in the world which are now patented and commercially available under the Sure Coat ® brand name.

In particular, Sure Coat ® Epoxigard, is a superior coating whose physical properties have been independently tested and found to be outstanding by PRI Asphalt Technologies Incorporated of Tampa, Florida.

Sure Coat ® Epoxigard has passed California's SCAQMD Rules 1106 for marine coatings and Rules 1113 for industrial coatings.

Sure Coat ® Epoxigard has been tested for Volatile Organic Content (VOC) using California's Environmental Protection Agency (EPA) method #24 and found to be 257g/l, which is far below the EPA acceptable level of 450g/l.

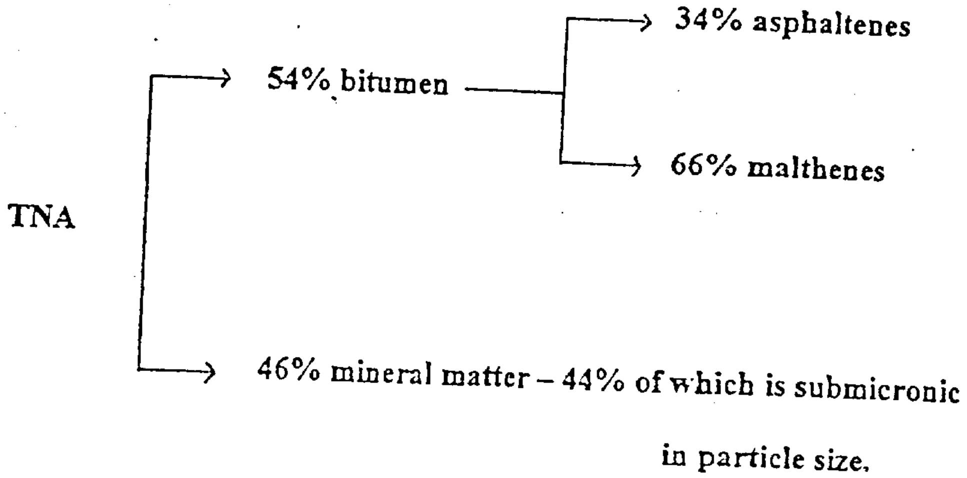
And right now, it is also being tested to an ASTM standard for use in potable water systems.

EM 154

But what make Sure Coat ® Epoxigard so distinct and superior to other coatings available worldwide?

First. Sure Coat ® Epoxigard has been developed using naturally rubberised Trinidad Natural Asphalt (TNA or Epure) which is 100% solids and divided into a bitumen and asphalt fraction.

Trinidad Natural Asphalt or TNA has superior properties even in its refined natural state and can be shown as follows:



The 54% bitumen in TNA is composed of asphaltenes and malthenes. Asphaltenes are responsible for the hardness of any bitumen, while malthenes are responsible for its sticky, resinous nature.

Asphalts are used as protective films because they are waterproof and weather-resistant. Some movement can occur without fracture because of their viscous (sol) nature. They give continuous, satisfactory service because of their slow rate of hardening from heat, oxidation, fatigue and weathering. Expose asphalt films harden partially from a loss of volatile oils and to a greater extend from the formation of additional asphaltene fractions and the loss of the sticky, resinous malthenes; i.e..,

$$\textbf{Oil (asphaltic} \quad \xrightarrow{\textbf{uv light}} \quad \textbf{goes off}$$

$$\textbf{Malthenes} \quad \xrightarrow[\textbf{Blowing (oxygen)}]{\textbf{uv light}} \quad \textbf{asphaltenes}$$

The oxidation, which is undoubtedly catalysed by ultra violet radiation, forms water-soluble degradation products which are removed from the asphalt film. The film then show typical crack patterns because of

IM #51

insufficient plasticising by the 'sticky' malthenes remaining in the continuous phase. However, there is no loss of durability as the pick up of water is a surface manifestation. The film softens and forms blisters but there is only minimal loss of bond to surfaces even with continued immersion in water. The film will continue to protect metals from corrosion for extremely long periods of time.

The addition of a softer material would allow for a longer weathering life before the malthene-asphaltene composition becomes critical and the coating fails. Yet one cannot assume that the softest material, the one with the highest malthene:asphaltene ratio, would necessarily be the most desirable. For example, while a bitumen of penetration grade 180/200 may be extremely soft as it has a high malthene:asphaltene ration, it cannot be used as a coating as is, simply because it will not dry.

It is therefore desirable to START with the ratio of malthenes:asphaltenes as high as possible to obtain a longer lifespan from a coating.

7/2 157

Second. Sure Coat ® Epoxigard has a very high solids content

Mineral fillers are usually added to asphalts to minimise the creation of voids due to evaporation and to increase the hardness of the dried or cured film. However, while these mineral fillers are opaque and offer added protection against weathering, they sometimes increase the water absorption of the asphalts.

By contrast, the high percentage of mineral matter in TNA consists largely of quartz in the form of sharp flakes and clay; Titanium dioxide accounts for 12.5% of TNA's mineral matter; and 44% of the total mineral matter is submicronic in particle size (much less than 10 um) which means that it never settles remaining instead in suspension and making TNA homogenous in nature;

Therefore, for a coating to be superior,

(1) the starting bitumen must have the highest possible malthene:asphaltene ratio;

(2) any incorporated mineral matter should have a low water absorption; and

(3) the solids content should be high and the particle size of the mineral matter should be extremely small reducing to a minimum the voids caused by evaporation during drying, and for improved hardness.

Refined TNA, the base product of Sure Coat ® Epoxigard, possesses all the above qualities which are necessary to give a coating superior properties.

Neither a blown (oxidised) bitumen with improved hardness but decreased adhesiveness, nor gilsonite or other natually occurring asphalts have TNA's colloidal mineral filler.

However, neither blown refinery bitumen nor naturally occurring gilsonite have the colloidal mineral filler as compared to what is present in TLA. For as Dr. Tada stated, the mineral matter looks like a honeycomb structure filled with polygonal plantlike materials of several microns and their coagulation's. Due to the shape of this mineral matter there is a larger surface area for contact with the bitumen as opposed to simple round particles. This finding (honeycomb effect) led Dr. Tada to conclude that 'the honeycomb structure of the mineral matter accounts for the secret in the unique properties of Trinidad Lake Asphalt'. <u>**Ref.1**</u>

The advantages of TNA as the starting bitumen are therefore:

(1) a naturally occurring high malthene:asphaltene ratio;

(2) a naturally occurring colloidal mineral filler of which 44% is less than 10 um in particle size

(3) a naturally occurring mineral structure which allows for greater contact due to its small particle sizes

<u>Third, the above qualities of TNA have not only been better combined and improved upon in Sure Coat ® Epoxigard, but Sure Coat ® Epoxigard is also naturally rubberised</u>

This make Sure Coat ® Epoxigard:

more elastic,

more flexible,

more 'spreadable' (better coverage),

IM #60

more able to resist movement due to quakes, transportation and more able to resist cracking due to expansion of coated surfaces.

<u>And fourth. Sure Coat ® Epoxigard is 100% eco-friendly.</u>

Advantages of a Sure Coat® Epoxigard Coating

1) A non-carcinogenic coating
2) A low VOC coating
3) A thick coat (8 mil DFT) with no cracks
4) A rubberised natural asphalt coating which is flexible but tough
5) Clean-up requires no special solvents – use vinegar
6) A coating which utilises the latest silica – coupling ageat (siloxane) Technology
7) A coating that can be undercoated or overcoated

JMM 101

Where presently used?

In the Caribbean: ~ Ship's hulls (under the water line) fibreglass, wood, Steel

~ animal farms where the pH is extremely high due to urea content; highly corrosive environment

~ tank farms

California: ~ hulls of aluminium boats "without primer"

Best used in the following environments:

- oil industry e.g. pipelines (on land and submerged), storage tanks etc.
- cargo and ballast tanks
- pillings, bilges, bouys
- ships (above and below waterline), pleasure crafts, etc.
- industrial plant equipment
- bridges
- sewer tanks/plants/waste management
- splash zones/spillage areas
- and a number of "harsh environmental" uses

IM 162

Note, this list is not exhaustive and if you require further information on a particular usage or for any additional enquiries, please feel free to contact:

Mrs. Dolly Nicholas or Dr. Anand Mungalsingh
ASPHALT PRODUCTS TRINIDAD LIMITED
Building #3, Demerara Drive
I.D.C. Compound
Point Lisas
TRINIDAD, W.I.

Telephone : 1 809 679 4052
Telefax : 1 809 636 3554
e-mail : ASPHALT@ WOW.NET

Ref.1: **Dr. H. Tada (1985): A Story about Trinidad Lake Asphalt, Doro Kensetu (Road Construction) Number 452 September 1985.**

Dolly Nicholas – **Asphalt Products Trinidad Limited**

Cleaning Claim.
(Credibility

Coatings Resource Corporation

Technical Data

SOLVENTLESS HIGH BUILD SURFACE TOLERANT EPOXY

CR - 35

INDUSTRIAL COATINGS

Description

CR-35 is a high build surface tolerant epoxy designed for non-immersion concrete and carbon steel surfaces. CR-35 offers low temperature cure, is 0-VOC and conforms to Title 21 CFR 175,300 USDA requirements and is applied with airless or conventional spray methods.

Environment

CR -35 is applied as a corrosion resistant product available in colors and is specified as a protective coating subject to splash, spillage, and chemical fumes as associated with the petrochemical, water & water-waste, mining & milling food processing, pulp & paper, and other selected industries. See chemical resistance guideline for specific environments.

Physical Characteristics

Type: Amine Cured Epoxy.
Mix Ratio: Premeasured 1 gal. & 5 gal. kits
Vol. Solids: 100%
Pot Life: ¾ Hour @72°F.(1-gal. mixed)
Thinner: Acetone .
Density: 12.0 #/Gal
Substrates: Prepared Carbon Steel or Prepared Concrete/Masonry
Colors: Off-White and tint bases. This product will yellow slightly in UV and
Gloss: oxidize.
VOC G/L: 70 degree @ 60 degree angle
DFT/Mils: 0
Recoat: 2-10
4-76 hours Depending on temp. and Humidity. Application Temperature Between 20°F-125°F., 0-95% Relative
Flashpoint: Humidity.
Dwell Time: Non-Flammable
1 hour @20°F.
45 min. @40°F.
30 min. @60°F.
20 min. @80°F.
5 min. @100°F.
Primer: Self Priming or CR-42, CR-44, CR-49

Application

Surface Preparation:

Remove all oil, grease, sludge, and other contaminants from surface prior to abrasive blasting. Carbon Steel - Prepare surface to accordance to SSPC-SP6 (commercial blast cleanliness) and achieve a 2-3 mil surface profile. Remove all weld spatter and welding residue and all sharp edges. Welds must be ground smooth.

Concrete - Scrape or grind fins and protrusions flush with the surface. Remove surface laitance and protrusions by abrasive blasting in accordance with SSPC-SP7 (brush-off blast cleaning) or Blas-Trac Method in effort to provide an anchor profile. Cr-35 is a prime/finish or can be utilized as a prime coat for other CR topcoats.

Mixing and Thinning:

Mix base component until a homogeneous mixture and color is obtained. Next, mix both components as is needed within the pot life of mixed material. Use air driven power or jiffy mixers. Add sufficient aggregate to mixed material as needed for application.

*Application:*Use Graco "Hydra-Cat" 45:1 Airless equipment or equal designed for spraying high solids coatings. Use Binks "Airless 1" spray gun with Reverse-A-Clean .021-.023 spray tips, 3/8" or larger solvent resistant fluid line with 1/4 " or larger air supply line. Adjust pump to the lowest possible setting that allows proper atomization.

For conventional spray application, use galvanized or other alloy metal pressure tanks with dual regulation and standard duty agitation. Binks "2001" spray gun, #66 fluid nozzle,#66SD air cap, #565 fluid needle, teflon fluid packing, lowest possible setting that allows proper atomization.

Erroneous Claim
Credibility

Coatings
Resource
Corporation

Technical Data

HIGH SOLIDS WATERBORNE URETHANE

CR-38

INDUSTRIAL COATINGS

Description

CR-38 is a very chemical resistant 0 VOC waterborne moisture cure polyurethane coating. This class product is designed as a protective primer/ finish over marginally prepared carbon and alloy steel under adverse weather conditions and is very user friendly.

Environment:

CR-38 is applied as a primer/ finish for steel tanks, piping, marine exposure, fiberglass, equipment and other substrates for moderate to severe atmospheric conditions that require ease of application and quick dry properties. This class product offers outstanding adhesion, low and high humidity cure, and can be utilized with various CR Industrial Primers.

Surface Preparation:

Remove all oil, grease, sludge, and other contaminants from surface prior to abrasive blasting steel. Prepare steel surface in accordance with SSPC-SP6. Abrasive 'Brush Off' Blast cured concrete surfaces in accordance with SSPC-SP7 Prepare intact coatings in accordance with SSPC-SP1 or SSPC-SP7. Check wood surfaces to insure dry, mildew free conditions exist.

Physical Characteristics

Type:	Acrylic Polyurethane
Mix Ratio:	3 parts B to 2 parts A by volume
Vol. Solids:	80%
Pot Life:	2 hours @ 70° F
Thinner:	Add 5-15% depending on application.
Density:	11.5 lb/gal
Substrates:	Prepared Steel, Concrete, Masonry, Fiberglass, Sheetrock, Wood.
Colors:	Various Tint Bases
Gloss:	Available in high,medium & low gloss.
VOC G/L:	0
DFT/ Mils:	1-3
Application:	Application temperature between 45-110°F & 10%-95% relative humidity.
Recoat:	2-48 hours @ 75° F
Primers:	Self Priming or CR-34, CR-42, CR-44, CR-49
Flashpoint:	Non-Flammable
Dwell Time:	15 minutes @40°F. 10 minutes @50-60°F. 5 minutes @60-80°F. 2 minutes @80-100°F. DO NOT REDUCE UNTIL DWELL TIME IS ACHIEVED.

Mixing and Thinning:

Mix base component until a homogeneous mixture and color is obtained. Next, pour activator slowly into base component while under slow agitation (less than 500 rpm with mechanical drill or mixer). Stirring with spatula or stir-stick is acceptable. Mix both components for approximately 2-3 minutes. High shear mixing is not recommended. After dwell time is achieved, reduce with clean fresh potable water, adding very slowly and mixing for 1-2 minutes. Typically, reduce with water no more than 5% when utilizing heavy duty airless equipment, 5%-10% for conventional spray, 5%-15% for brush and roll application. Adding water increases pot life by 30-minutes to 1 hour depending on temperature.

Application: Conventional – Use galvanized or other alloy metal pressure tanks with dual regulation and standard duty agitation, Binks "2001" spray gun, #66 fluid nozzle, #66SD air cap, #565 fluid needle, teflon fluid packaging. 3/8" or larger solvent resistant fluid line and ¼" or larger air supply line. Adjust air and material pressure to the lowest possible setting that allows proper atomization.

Airless Spray- Use Graco 33:1 Airless equipment or equal designed for spraying high solids coatings. Use Binks 'Airless 1' Spray gun with Reverse-A-Clean 0.017-0.019 spray tips, 3/8" or larger solvent resistant fluid line with ¼" or larger air supply line. Adjust pump pressure to the lowest possible setting that allows proper atomization.

Brush and Roller: Use solvent resistant mohair or other natural brushes with feather edge. Roller shall be solvent resistant phenolic core with nap sheepskin or other natural roller.

For further technical information contact your Coatings Resource Representative

5582 McFadden Avenue ◆ Huntington Beach ◆ CA 92649
(714) 894-5252 ◆ FAX (714) 893-2322

In 263

Supplier Starting Point

MorKote™ 1035 Acrylic Emulsion

INDUSTRIAL COATINGS

Description

MorKote 1035 is a very low temperature film forming acrylic copolymer emulsion for low VOC applications. It offers excellent flexibility, adhesion and high gloss capabilities. MorKote 1035 is recommended for exceptional tannin stain blocking and "bleed through" resistance over redwood. This emulsion offers good tannin block properties with stain inhibitive additives without the incorporation of zinc oxide.

Typical Properties*

Appearance	Translucent
Total Solids, % Weight	48
Glass Transition Temperature (Tg °C)	-42
Min. Film Formation Temperature (MFFT °C)	<5
Brookfield Viscosity (cps)	1500
Acid Number	45
pH	8.0
Density (lbs./gallon)	8.6
Freeze/Thaw Stable	Yes
Pigment Grind Vehicle	Yes

**Typical properties are not intended to be product specifications.*

Features

- High Gloss Capabilities
- Excellent Flexibility
- Tannin Block Resistance Without Zinc Oxide
- Good Flow and Leveling
- Very Low VOC Capabilities

Industrial Applications

- Tannin Block Primer
- Modifier for Low VOC Applications

Formulation Recommendations

Coalescent Solvents

MorKote 1035 is compatible with a wide variety of coalescent solvents. The recommended coalescent solvent level is 0% to 10% based on resin solids. MorKote 1035 acrylic emulsion exhibits good compatibility with:

Diethylene Glycol Monobutyl Ether (DB)
Diethylene Glycol Monoethyl Ether (DE)
Diethylene Glycol Monomethyl Ether (DM)
Diethylene Glycol Monoethyl Ether (DP)
Dipropylene Glycol Methyl Ether* (DPM)
Ethylene Glycol Monobutyl Ether (EB)
Propylene Glycol
Texanol®

**Pre-dilute with water 50/50 to prevent shock to the emulsion.*

Defoamers

Defoamers are an important additive to a paint formulation. Ease of incorporation is a key criteria for defoamer selection. Defoamers are effective when they are insoluble in the medium to be defoamed and when they display a certain degree of selective incompatibility. As a result, the following side effects should be considered: 1) Gloss Decrease, 2) Haziness in Clear Systems, 3) Tendency toward Crater Formation and 4) Possible Influence on Intercoat Adhesion. Since individual defoamer products behave differently in regard to potential side effects, the formulator must be sure to consider these variables when making defoamer selection. Defoamers should be screened at various levels to reach the proper balance between desired defoaming action and undesired side effects. Henkel Foamaster® VL is an effective defoamer for MorKote™ 1035.

In addition, Ultra Additives has three foam control agents that are effective with MorKote 1035. DEE FO® PI-35 is an effective silicone defoamer that can be used at 0.2% based on total formula weight. DEE FO PI-12 is a mineral oil based defoamer with excellent persistence and shear stability that can be used at 0.5% based on total formula weight. DEE FO 3010E/50 is an organically bound defoamer with excellent long-term stability, shear stability and substrate wetting that can be used at 0.5% based on total formula weight. These foam control agents were tested with neat MorKote 1035 using the Red Devil Shaker Test (Test Method UAI-130) and heat age stability study.

Stain Inhibitive Additives

MorKote 1035 exhibited excellent tannin block resistance on redwood with Wayne Pigments Corporation Stainban® 185, an aqueous stain inhibitive additive. Stainban® 185 was added at a level of 2.5% active inhibitor on resin solids. The formulator does not need to incorporate zinc oxide that can cause in-can stability problems. In addition, MorKote 1035 showed good tannin block resistance with Halox Pigments XTAIN® A at loading 15 pounds per 100 gallons when formulated at 20% and 40% [illegible] level. Zinc oxide does not need to be used in the tannin block primer.

ZM 182

Supplier Hasting Paint

HIGH GLOSS WHITE TOPCOAT
MorKote™ 1001 Acrylic Emulsion
Formula 803-15

Material	Quantity Pounds	Quantity Gallons	Description
Grind:			
Butyl Cellosolve	39.00	5.20	Coalescent Solvent
Water	46.00	5.50	Carrier
Proxel® GXL	0.20	0.02	Preservative
Tamol® 681	10.60	1.16	Dispersant
Triton® GR-7M	2.40	0.30	Surfactant
DEE FO® HG-12	2.00	0.30	Defoamer
Ti-Pure® R-902	200.00	6.00	Titanium Dioxide
Grind at high speed for 6+ Hegman, then add:			
Letdown:			
MorKote™ *1001*	679.00	79.00	Acrylic Emulsion
Ammonium Hydroxide, 28%	1.50	0.20	Buffer
Texanol®	13.00	1.65	Coalescent Solvent
SM 2169	0.80	0.12	Mar/Slip Additive
Flash X-150	7.00	0.72	Flash Rust Inhibitor
DEE FO® HG-12	2.00	0.26	Defoamer
Add the following, adjust for final viscosity:			
Acrysol® RM-2020	11.50	1.34	Associative Thickener
Total	1015.00	101.77	

Formulation Properties

Physical Properties

% Solids by Weight	50.3
% Solids by Volume	40.0
% PVC	14.8
Pigment/Binder Ratio	0.64
VOC (grams/liter)	135

Specification Properties

Viscosity (KU)	82
ICI Viscosity (poise)	1.4
Density (lbs./gallon)	9.97
pH	8.0
Initial Gloss (60°/20°)	82/49
Sag Resistance (mils)	10

Dry Times (ASTM D-1640):

Dry to Touch (minutes)	15
Tack-Free (minutes)	30
Recoat (minutes)	70

Ambient Stability	Passes
Oven Stability (30 days@120°F)	Passes
Freeze/Thaw	Passes 5 cycles

Performance Properties

Adhesion (ASTM D3359-78)

Metals	
Cold Roll Steel	Excellent
Bonderite 1000	Excellent
Galvanized	Good
Aluminum	Poor
Plastics	
Acrylic Sheet	Excellent
Polycarbonate (Lexan LS2-111)	Excellent
Polypropylene	Good
PVC	Poor

Chemical Resistance (ASTM D1308-87)

Reagents	*1 hour Spot Test*
25% Sodium Hydroxide	No Effect
50% Sodium Hydroxide	No Effect
10% Phosphoric Acid	No Effect
25% Phosphoric Acid	No Effect
10% Sulfuric Acid	No Effect
25% Sulfuric Acid	No Effect
15% Nitric Acid	No Effect
Water	No Effect

Wet Adhesion Scrub Test

Glossed Alkyd	Passed, 1000 cycles

Scrub Resistance

(Modified ASTM D2486-Q5)	Passed, 1000 cycles

Blister Resistance (ASTM D714)

1 hour soak	10

Pencil Hardness (ASTM D3363)

7 days cure	HB

Block Resistance (ASTM D4946)

Ambient, 1 hour @ 3 psi, 7 day cure	10 (excellent)
120°F, 1 hour @ 3 psi, 7 day cure	7 (good to very good)

TM2-01

Raw Material Suppliers

Supplier	*Raw Material*	*Phone Number*
Eastman Chemical	Coalescent Solvents, Texanol® & EB	(800) EAS-TMAN
E.I. Dupont	Titanium Dioxide, Ti-Pure® R-902	(800) 441-9485
GE Silicones	Mar/Slip Additive, SM 2169	(800) 255-8886
Halox Pigments	Flash Rust Inhibitor, Flash X-150	(219) 933-1560
Morton International, Inc.	Acrylic Emulsion, MorKote™ 1001	(800) FOR-RESN
Rohm & Haas Company	Associative Thickener, Acrysol® RM-2020	(215) 592-3000
Rohm & Haas Company	Dispersant, Tamol® 681	(215) 592-3000
Ultra Additives	Defoamer, DEE FO® HG-12	(800) 524-0055
Union Carbide	Surfactant, Triton® GR-7M	(800) 752-1827
Zeneca	Preservative, Proxel® GXL	(800) 523-7391

If you would like additional information write, fax or call Morton International at the following worldwide locations:

Morton International, Inc.
Waterbased Polymers—CANADA
430 Finley Avenue
Ajax, Ontario, Canada LIS 2E3
General Number: 905-683-2071
Facsimile Number: 905-683-7272

Morton International S.A. De C.V.
Waterbased Polymers—MEXICO
Calle 6 Norte No. 100
Esquina Ese 1 Norte
Ampliacion Parque Industrial Toluca 2000
50200 Toluca, Estado de Mexico
General Number: 52-72-79-0082
Facsimile Number: 52-72-79-0212

Morton International, Inc.
Waterbased Polymers—FRANCE
Le Pressoir Vert
45400 Fleury les Aubrais
Semoy, France
General Number: 33-238-618100
Facsimile Number: 33-238-618132

Morton International Produtos Quimicos Ltda.
Waterbased Polymers—BRAZIL
Rua Cincinato Braga 59
2° - Conj "C-1" CEP 01333
Sao Paulo, Brazil
General Number: 55-11-287-6154
Facsimile Number: 55-11-288-3602

Morton International GmbH
Waterbased Polymers—GERMANY
Beim Struckenberge 11
D-28239 Bremen, Germany
P.O. Box 210254
D-28222 Bremen, Germany
General Number: 49-421-64980
Facsimile Number: 49-421-6498103

Morton International Limited
Waterbased Polymers—UNITED KINGDOM
Westward House
115-157 Staines road
Hounslow, Middlesex TW3 3JB
General Number: 44-181-570-7766
Facsimile Number: 44-181-572-5516

Morton International Pte. Limited
Waterbased Polymers—PACIFIC REGION
135 Pioneer Road
Singapore 639589
General Number: 65-861-0822
Facsimile Number: 65-861-9534

Responsible Care®

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Revision: 9/93

Morton

FM 206

Supplier Starting Point

HAPS FREE HIGH GLOSS TOPCOAT
MorKote™ 1400 Acrylic Emulsion
Formula 790-1930 B

Material	Quantity Pounds	Quantity Gallons	Description
Grind:			
MorKote™ 1400	250.0	28.51	Acrylic Emulsion
Surfynol® CT-131	2.9	0.33	Dispersant
BYK®-022	1.0	0.12	Defoamer
Ti-Pure® R-706	196.0	5.62	Titanium Dioxide
Grind to Hegman 7 or better, then add:			
Letdown:			
MorKote™ 1400	445.0	50.74	Acrylic Emulsion
BYK®-024	2.0	0.24	Defoamer
Water	10.65	1.28	Carrier
Propylene Glycol	43.0	4.98	Coalescent Solvent
Dowanol® DPM	11.0	1.39	Coalescent Solvent
Texanol®	40.0	5.06	Coalescent Solvent
BYK®-346	5.0	0.60	Wetting Agent
Flash X-150	5.0	0.54	Flash Rust Inhibitor
Hold thickener for final viscosity adjustment			
Tafigel™ PUR 50	5.0	0.59	Associative Thickener
Totals	1016.55	100.00	

Formulation Properties

Physical Properties	
% Solids by Weight	51.8
% Solids by Volume	42.0
% PVC	13.7
VOC (grams/liter)	205
Specification Properties	
Viscosity (KU)	86
ICI Viscosity (poise)	1.2
Density (lbs./gallon)	10.1
pH	8.2
Initial Gloss (60° / 20°)	91/55
Sag Resistance (mils)	7
Dry Times (ASTM D-1640)	
Dry to Touch (minutes)	30
Tack-Free (minutes)	60
Recoat (minutes)	120
Freeze Thaw	Passes 5 Cycles
Ambient Stability (30 days)	Passes
Oven Stability (30 days @ 50°F)	Passes

Performance Properties

Adhesion (ASTM D3359-78)	
Aluminum	Good
Bonderite 1000	Excellent
Cold Rolled Steel	Excellent
Chemical Resistance (ASTM D1308-87)	
Deionized Water	No Effect
25% Sodium Hydroxide	Ring
25% Phosphoric Acid	No Effect
25% Sulfuric Acid	No Effect
Propylene Glycol	Slight Ring
Blister Resistance (ASTM D714)	
1 hour soak	10
24 hour soak	10
Block Resistance (ASTM D4946)	
Ambient, 24 hours, 7 days cure	10
120°F, 1 hour, 7 days cure	9
Pencil Hardness (ASTM D3363)	
7 days cure	3B

I M 787

Keyplan

HAPS FREE GENERAL INDUSTRIAL TOPCOAT
MorKote™ 1725 Acrylic Emulsion
Formula 997-23

Material	Quantity Pounds	Quantity Gallons	Description
Grind:			
MorKote™ 1725	55.90	6.50	Acrylic Emulsion
Water	16.66	2.00	Carrier
Surfynol® CT-136	3.00	0.34	Disperant
BYK®-024	2.00	0.24	Defoamer
Ti-Pure® R-706	200.00	6.00	Titanium Dioxide
Grind at high speed to 6 to 6.5 Hegman, then add:			
Letdown:			
Water	73.39	8.81	Carrier
Add slowly, then mix for 10 minutes			
MorKote™ 1725	589.10	68.50	Acrylic Emulsion
Add and mix for 15 minutes			
DPnB	45.30	6.00	Coalescent Solvent
Add and mix for 15 minutes			
BYK®-024	3.00	0.36	Defoamer
BYK® 307	2.00	0.23	Surface Tension Modifier
Mix for 20 minutes			
Flash X-150	10.00	1.02	Flash Rust Inhibitor
Totals	1000.35	100.00	

Formulation Properties

Physical Properties

% Solids by Weight	51.9
% Solids by Volume	41.5
% PVC	14.5
VOC (grams/liter)	114

Specification Properties

Viscosity (KU)	83
ICI Viscosity (poise)	1.2
Density (lbs./gallon)	10.0
pH	8.7
Initial Gloss (60° / 20°)	84/50
Sag Resistance (mils)	16

Dry Times (3 mils wet, 35%-40% R.H. @ 70-75°F)

Dry to Touch (minutes)	15
Tack-Free (minutes)	45
Recoat (minutes)	60
Oven Stability (30 days @ 120°F)	Passed

Performance Properties

Adhesion (ASTM D3359-78)

Bonderite 1000	Excellent
Cold Rolled Steel	Excellent
Galvenized	Excellent
Pencil Hardness (ASTM D3363-92A)	F

Chemical Resistance (ASTM D1308-87)

Water	No Effect
25% Sodium Hydroxide	No Effect
50% Sodium Hydroxide	Blushed, Dull Film
10% Phosphoric Acid	No Effect
25% Phosphoric Acid	No Effect
10% Sulfuric Acid	No Effect
25% Sulfuric Acid	No Effect
25% Nitric Acid	Dull Film, Slightly Soft Film

FM70

Supplier.

INTERIOR SATIN STAIN RESISTANT COATING
MorKote™ 1043 Acrylic Emulsion
Formula 997-21

Material	Quantity		Description
	Pounds	Gallons	
Grind:			
Water	54.10	6.50	Carrier
Proxel® GXL	1.50	0.16	Preservative
Surfynol® CT-324	3.00	0.34	Dispersant
Tergitol® NP-9	3.00	0.35	Surfactant
Drew® L-475	2.00	0.26	Defoamer
Ti-Pure® R-706	200.00	6.50	Titanium Dioxide
Min-u-sil® 30	90.00	4.07	Flattener
Grind to 5+ Hegman			
Letdown:			
Water	242.07	29.06	Carrier
Propylene Glycol	30.80	4.00	Coalescent Solvent
Sift in slowly			
Natrasol® Plus	2.00	0.18	Cellulosic Thickener
Mix 5 minutes			
Ammonium Hydroxide, 28%	2.00	0.27	Buffer
Mix 30 minutes			
MorKote™ 1043	396.00	45.00	Acrylic Emulsion
Mix 10 minutes			
Acrysol® RM-8W	13.00	1.44	Associative Thickener
Mix 15 minutes			
Aerosol® OT-75	1.00	0.10	Wetting Agent
BYK® 307	1.50	0.18	Slip/Mar Additive
Mix 10 minutes			
Texanol®	11.85	1.50	Coalescent Solvent
Drew® L-475	3.00	0.39	Defoamer
Mix 10 minutes			
Hold for Viscosity adjustment			
Acrysol® RM-8W	3.00	0.33	Associative Thickener
Totals	1058.82	100.00	

Formulation Properties

Physical Properties

% Solids by Weight	47.8
% Solids by Volume	35.8
% PVC	28.6
VOC (grams/liter)	129.4

Specification Properties

Viscosity (KU)	90
ICI Viscosity (poise)	1.3
Density (lbs./gallon)	10.59
pH	9.2
Initial Gloss (60°)	16
Sheen (85°)	22
Sag Resistance (mils)	12

Dry Times (3 mils wet, 35%-40% RH @ 70-75°F)

Dry to Touch (minutes)	15
Tack-Free (minutes)	30
Recoat (minutes)	120
Freeze Thaw	Passed 5 Cycles
Oven Stability (30 days @ 120°F)	Passed

Performance Properties

Wet Adhesion Scrub Test Gloss Alkyd	Passed, 1000+ Cycles
Scrub Resistance (Modified ASTM D2486-Q6)	Passed, 1000+ Cycles
Stain Removal Properties	Excellent

F Nov 209

Waterborne Coatings Limitations

AMERON

Amercoat® 220
Waterborne acrylic

Product Data

- Self-priming
- VOC-compliant
- Single-package convenience
- Gloss or satin
- Brush, roll or spray
- Dries fast, minimum downtime
- Interior for OEM
- Excellent gloss retention and weathering
- Superior impact resistance and flexibility
- Washable, scrub-resistant
- Durable, chemical-resistant
- Stain resistant
- Quick, easy clean up
- Wide color range

Not good....

Amercoat 220 is a high-performance waterborne acrylic enamel that may be applied direct* to metal on most exterior and interior surfaces. Also ideal for concrete and masonry, it may be used over tightly adhering old paint and rust as well as primed surfaces. Amercoat 220 provides a beautiful, flexible, cleanable gloss finish that resists cracking, peeling and impact damage. Amercoat 220 significantly out-performs conventional acrylic coatings. It retains color and gloss like a polyurethane, far better than traditional alkyds.

Amercoat 220 requires minimal surface preparation, usually only metal etching or power tool cleaning to remove loose rust. Easy to apply and clean up, Amercoat 220 is a versatile topcoat for a wide variety of new construction and maintenance application. Contact your Ameron representative for conditions outside the requirements or limitations described.

Important – Amercoat 220 deep or dark colors made from neutral or clear tint base should always be used with a prime coat when going over metallic surfaces such as steel and aluminum.

Typical Uses

- Walls
- Food processing plants
- Institutional maintenance and new construction
  - Schools
  - Hospitals
  - Laboratories
  - Storage areas
- Industrial maintenance and new construction
  - Tank exteriors
  - Structural steel
- Marine applications
  - Vessel topsides and interiors
  - Offshore platform topsides and interiors

Not recommended for continuous immersion

Physical Data

Finish	Gloss	
Color	See color chart	

Uniform appearance will require two coats of white or pastel colors over dark substrates. Use only light-colored primer or intermediate coat when one finish coat of white or pastel Amercoat 220 is specified. Gloss varies with color.

Components	1	
Curing mechanism	Drying	
Volume solids (calculated)	35% ± 3%	
Dry film thickness per coat	2 mils (50 microns)	
direct-to-metal	2-5 mils (50-125 microns)	

Coating thickness depends on severity of exposure and surface roughness.

Coats	1 to 2	
Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)	561	13.8
2 mils (50 microns)	280	6.9
VOC	1.5 lb/gal	180 g/L
Flash point (SETA)	°F	°C
Amercoat 220	>212	>100

Qualifications

NFPA – Class A

USDA – Incidental Food Contact

Application Data

Applied over	Prepared or primed steel and concrete, previously painted surfaces, wood, aluminum, galvanizing, dry wall
Primer	148, 151, 385, 400, 5105, Dimetcote®21-5 or D21-9

When applying over Dimetcote 21-5, Amercoat 556 Additive must be used.

Surface preparation	See primer application instructions
Method	Conventional or airless spray, brush, roller

Environmental conditions

Temperature	°F	°C	
air	40 to 110	4 to 43	
surface	40 to 120	4 to 49	
Relative humidity		°F	
(maximum)	40	50 to 100	>100
	60%	55%	95%

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation.

Formerly Amerguard™ 220

0° Waterborne limitations

Ameron

Amercoat® 300

Waterborne epoxy

Product Data

- Zero VOC
- No hazardous waste generated
- Non-flammable
- Low odor/no shut down
- Solvent-free; no air emissions, water only
- Easily cleaned
- High performance, comparable to solvent epoxy
- Abrasion and impact resistance
- Splash/spillage resistance to a wide range of chemicals
- Chemical and corrosion resistant
- Suitable for most industrial applications
- Adheres to a variety of different coatings
- Durable

Typical Uses

Steel and concrete surfaces in:

- Chemical plants, oil refineries
- Offshore platforms and other structures
- Nuclear facilities
- Food processing facilities
- Pharmaceutical plants
- Hospitals
- Micro chip facilities
- Equipment manufacturing plants
- Storage tank exteriors

Qualifications

USDA – Incidental food contact

Physical Data

Finish*	Gloss	
Color	See Ameron color card	
Components	2	
Curing mechanism	Evaporation of water and chemical reaction between components	
Volume solids (calculated)	44% ± 3%	
Dry film thickness per coat	2 mils (50 microns)	
Coats**	1 or 2	
Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)	706	17.3
2 mils (50 microns)	353	8.7
VOC mixed	0.0 lb/gal	0.0 g/L
Flash point (SETA)	°F	°C
resin and cure	>200	>93

Application Data

Applied over	Primed steel and primed or prepared concrete, previously coated surfaces		
Surface preparation	See specific primer		
concrete	ASTM D4259 or ASTM D4260		
aged coatings	SSPC-SP1, 3 or 7		
Primer			
steel	Amercoat 148, 151		
concrete	None** or Nu-Klad® 105A, 114A or 120A		
Method	Conventional or airless spray		
Mixing ratio (by volume)	1 part resin to 4 parts cure		
Induction time	15 - 30 minutes		
Pot life (minutes)		°F/°C	
	90/32	70/21	50/10
	15	45	$1^1/_2$ (hrs)

Note: Pot life can be extended up to $3^1/_2$ hours @ 70°F (21°C) with the addition of water at $^1/_2$ pint (6%) per mixed gallon of Amercoat 300, during initial mixing of resin and cure.

Environmental conditions		
Temperature	°F	°C
air and surface	50 to 120	10 to 49
Relative humidity		
50 to 100°F	maximum 85%	
above 100°F	maximum 95%	

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation.

* *Gloss appearance depends on application method and substrate.*

** *Uniform appearance may require two coats of white or light colors on tanks and other large structures over contrasting primers or intermediate coats. Use only a light-colored primer or intermediate coat when one finish coat of white or light color is specified.*

Formerly Amercoat 2203B

5.30

POLY-DURA-THANE
WATER BASED URETHANE

Industrial and Marine Coatings

PART A B65W700 ULTRA WHITE
PART B B65V700 HARDENER

PRODUCT INFORMATION

Revised 1/93

PRODUCT DESCRIPTION

POLY-DURA-THANE is an advanced technology, VOC compliant, water based, polyester urethane enamel. Provides performance properties comparable to premium quality solvent based urethanes. Poly-Dura-Thane is a high gloss abrasion resistant urethane that has excellent weathering properties.

- Retains its appearance over a wide range of chemical, weather, and mechanical conditions
- Can be applied directly to water based and solvent based organic zinc rich primers
- Suitable for use in USDA inspected facilities
- Low odor
- Non-flammable

RECOMMENDED USES

For use over prepared substrates in industrial and marine environments, such as:

- Offshore platforms
- Structural steel
- Paper mills
- Power plants
- Conveyors
- Marine applications
- Industrial machinery and equipment
- Exterior surfaces of steel tanks
- Rail cars and locomotives
- Chemical processing equipment
- Bridges
- Refineries

PRODUCT CHARACTERISTICS

Finish:	Gloss, 85+ units at 60°
Color:	Ultra White
Volume Solids:	53%±2%, catalyzed, unreduced 50%±2%, catalyzed, reduced 10% 47%±2%, catalyzed, reduced 25%
Weight Solids:	71%±2%, catalyzed, unreduced
VOC (EPA Method 24):	Unreduced: 63 g/L; 0.53 lb/gal
Mix Ratio:	3:1 by volume

Recommended Spreading Rate per coat (at 10% reduction):

Wet mils:	4.0 - 6.0
Dry mils:	2.0 - 3.0
Coverage:	232 - 424 sq ft/gal approximate

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 5.0 mils wet @ 50% RH:

	@ 55°F	@ 77°F	@ 120°F
To touch:	3 hours	1½ hour	45 minutes
To handle:	12 hours	8 hours	2 hours
To recoat			
minimum:	18 hours	8 hours	2-4 hours
maximum:	14 days	14 days	14 days
To cure:	14 days	10 days	2 days
Pot Life:	4 hours	4 hours	1 hour
Sweat-In Time:	none	none	none

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity and film thickness dependent.

Shelf Life:	12 months, unopened, at 77°F
Flash Point:	>200°F Seta, catalyzed
Reducer:	Water, 10% minimum reduction required
Clean Up only:	Reducer R7K15

PERFORMANCE CHARACTERISTICS

System Tested: (unless otherwise indicated)
Substrate: Steel
Surface Preparation: SSPC-SP10
Primer: 1 ct. Dura-Pox 245 WB Primer @ 4.0 mils dft
Finish: 1 ct. Poly-Dura-Thane @ 3.0 mils dft

Abrasion Resistance:
Method: ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load
Result: 45 mg loss

Adhesion:
Method: ASTM D4541
Result: 800 psi

Corrosion Weathering:
Method: ASTM D5894, 8 cycles, 2000 hours
Result: Rating 10 per ASTM D610 for rusting, no more than 1/8" rust creepage at scribe

Direct Impact Resistance:
Method: ASTM G14
Result: >120 in lb

Dry Heat Resistance:
Method: ASTM D2485
Result: 200°F constant, 250°F intermittent

Flexibility:
Method: ASTM D522, 180° bend, 1/8" mandrel
Result: Passes

Pencil Hardness:
Method: ASTM D3363
Result: 2H

Salt Fog Resistance:
Method: ASTM B117, 2000 hours
Result: Rating 10 per ASTM D610 for rusting, no more than 1/8" rust creepage at scribe

Thermal Shock:
Method: ASTM D2246, 10 cycles
Result: Passes

continued on back

IM 310

Carcinogenic Activator

AST D45+

Envirocoat

Technical Specification

Product Description
A milky white water suspension two pack Polyurethane Acrylate Coating cross linked with polyfunctional azerdine (free azerdine 0.1%)

Product Detail

	Clear	*Coloured*
PH Value	8.0	9.0
Specific Gravity	1.04	1.24
Solids Content	33.5%	44.4%
Viscosity	15 secs. to FC4	30 secs. to FC4
Thickness Wet	70 - 75 Microns	85 - 95 Microns
Thickness Dry	20 - 25 Microns	30 - 35 Microns
Flash Point	Non Flammable	Non Flammable

Coverage Guide

New Paint and GRP	20-25 sq. mtrs. per litre
Old Paint and GRP	20-22 sq. mtrs. per litre
Stonework, Masonry	7.5-10 sq. mtrs. per litre
Brick, Marble	7.5-10 sq. mtrs. per litre
Cement Screed	8 sq. mtrs. per litre
Roughcast Wall	3.5 sq. mtrs. per litre
Concrete floor on basecoat	15-20 sq. mtrs. per litre (two coats)

Application

Method	HVLP systems are recommended. Brush, roller and conventional spray equipment may be used, providing supplier instructions are followed.
Mixing	Information available on request to approved customers.
Temperature	Information available on request.
Thinning	Water, but not more than 10%.
Pot Life	On request
Drying time	Dust free: 30 approx. minutes. Touch Dry: 2-3 hours Cured: 36 hours
Second Coat	5 minutes at 22 deg. centigrade, with HVLP application.

Independent Tests

IM 108

Specific Use / Specialized Application Equipment

Coatings
Resource
Corporation

Technical Data

HIGH BUILD EPOXY TANK LINING

CR - 24

INDUSTRIAL COATINGS

Description

CR - 24 is a high build amine cured phenolic epoxy coating designed to protect concrete and steel surfaces at higher temperatures (+200°F.). This class product is applied with heavy duty airless and conventional spray equipment.

Environment

CR - 24 is applied as a chemical resistant tank lining subject to high temperature crude oils, high temperature water and brine, and other selected chemicals as associated with the petrochemical, water & wastewater, mining & milling, pulp & paper, and other selected industries. See chemical resistance guideline for specific environments.

Physical Characteristics

Type:	Amine Cured Epoxy.
Mix Ratio:	Premeasured 1 gal. & 5 gal. kits
Vol. Solids:	75%
Pot Life:	2 Hours @70°F.
Thinner:	Acetone if needed.
Density:	12.0 #/Gal
Substrates:	Prepared Carbon Steel or Prepared Concrete/Masonry
Colors:	Gray, White.
Gloss:	Medium
VOC G/L:	196
DFT/Mils:	2-10
Recoat:	4-48 depending on temperature and humidity. Application Temperature between 40-125°F., 0-90% Relative Humidity.
Flashpoint:	Flammable

Application

Surface Preparation:

Remove all oil, grease, sludge, and other contaminants from surface prior to abrasive blasting. Carbon Steel - Prepare surface to accordance to SSPC-SP10 (Near White Metal Blast Cleanliness) and achieve a 2-3 mil surface profile. Remove all weld spatter and welding residue and all sharp edges. Welds must be ground smooth.

Concrete - Scrape or grind fins and protrusions flush with the surface. Remove surface laitance and protrusions by abrasive blasting in accordance with SSPC-SP7 (brush-off blast cleaning) or Blas-Trac Method in effort to provide an anchor profile. CR-24 is self priming.

Mixing and Thinning:

Mix base component until a homogeneous mixture and color is obtained. Next, mix both components as is needed within the pot life of mixed material. Use air driven power or jiffy mixers.

Application:Use Graco "Hydra-Cat" 45:1 Airless equipment or equal designed for spraying high solids coatings. Use Binks "Airless 1" spray gun with Reverse-A-Clean .021-.023 spray tips, 3/8" or larger solvent resistant fluid line with 1/4 " or larger air supply line. Adjust pump to the lowest possible setting that allows proper atomization.For conventional spray application, use galvanized or other alloy metal pressure tanks with dual regulation and standard duty agitation, Binks "2001" spray gun, #66 fluid nozzle, #66SD air cap, #565 fluid needle, teflon fluid packing, 3/8" or larger solvent resistant fluid line and 1/4" or larger air supply line. Adjust air and material pressure to the lowest possible setting that allows proper atomization.

IM
7 03

Specific Use / Heat Cure.

2031

PROTECTIVE LINING FOR SUPERIOR CORROSION AND HIGH TEMPERATURE RESISTANCE WITH EXCEPTIONAL FLEXIBILITY AND TOUGHNESS

DESCRIPTION

Siloxirane® 2031 is a two-component force cure system that offers unique characteristics.
Siloxirane 2031 is a cross-linked organic-inorganic multifunctional polymer coating that is cured though homopolymerization. This dense crosslinked polymer exhibits high flexibility and toughness, having no detrimental hydroxyl or ester groups.

Due to Siloxirane 2031's temperature resistance (500° F/260° C), it provides superior resistance to:

- Acids, alkalis, solvents, oxidizing agents
- Thermal shock -40° F (-40° C) to +500° F (+260° C)
- Flex stressing
- Wear and abrasion
- Impact

APPLICATION HIGHLIGHTS

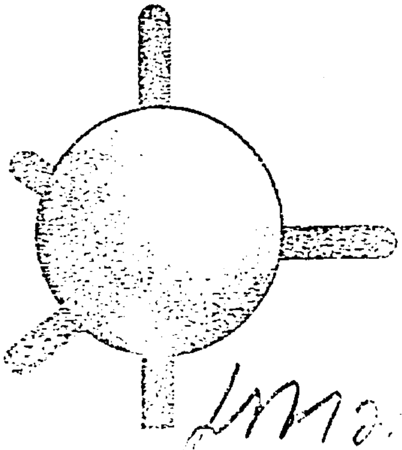
- Superior bonding qualities
- Applied to pitted corroded steel
- Very low VOC - 108 grams/L (0.9 lbs. per gallon)
- Outstanding flexibility
- Non-permeable
- Steam cleanable
- Resists hydroblasting
- Repairable
- Sunlight resistant
- Coefficient of thermal expansion equal to stainless steel
- Complies with FDA 21 CFR 175.300
- Resists high voltage spark test

INDUSTRY APPLICATIONS

- **Power Generation** - FGD Systems, Ducts, and Stacks, etc.
- **Chemical Processing** - Tanks, Reactor Vessels, Hazardous Waste Hauling, etc.
- **Paper & Pulp** - Digesters, Black Liquor Tanks, Bleaching, etc.
- **Steel** - Pickling Tanks, Acid Storage, Acid Waste Neutralization, etc.
- **Mining** - Acid Tanks, Scrubbers, etc.

TYPICAL PROPERTIES

Color (Normal)	Oyster White (Can be pigmented)
V.O.C. Level	108 grams/L (0.9 lbs. /gal.)
Lead Content	Zero
Chromate Content	Zero
Pot Life	120 min. @ 75° F (24° C)
Viscosity Reduction	Reduce with MEK*
Flash Point	127° F (53° C)
Solids by Volume	83.6%
Solids by Weight	95.5%
Practical Coverage	73 sq. ft. per gallon at 14 mils DFT
Recommended DFT (1-2 coat application, see directions)	14 mils dry average 16-18 mils wet
Shelf Life (Unopened can)	12 months



PHYSICAL PROPERTIES

Tensile Strength (@75° F) (ASTM D538)	13.240 p.s.i.
Flexural Strength	13.443 p.s.i.
Flexural Modulus (ASTM D790)	979 k.s.i.
Water Absorption (30 Days @88° F) (ASTM D570)	0.09%
Permeability (Vapor Transmission of Water at 90° C for 7 days)	0.0000 gm. (per sq. ft. per 7 days per inch thickness)
Coefficient of Thermal Expansion (-50° C to 150° C) (ASTM D696)	19 (in./in./°C x 10⁻⁶)
Elongation (75° F)	11.3%
Hardness	75-78 Barcol
Impact Resistance (ASTM D2794)	140 in/lbs
U.V. Light Resistance (ASTM G53)	40+ years
Bond Strength (Lap Shear @ 75° F (24° C)) (Carbon Steel, Grit Blasted)	5.200 PSI

APPLICATION DATA

Note: Detailed instructions are provided separately for Siloxirane coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone MEK

Limitations

Apply when the air and surface temperatures are above 50° F. Surface temperatures must be at least 5° F above the dew point. For optimum application properties, bring material to 70-90° F prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Airless spray equipment with 45:1 pump ratio @80-100 lbs. to achieve 2400-3000 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 3/16" by 6' whip hose, with a maximum of 100 linear feet. This coating is a low VOC compliant material. If shop conditions require a viscosity adjustment, thin with MEK.

Cure Time And Temperature

Curing: Blow air over lining for 2 hours to remove solvent prior to curing. Raise temperature of metal substrate 50° F per hour. Maintain at 350° F (177° C) for 4 hours.

(See full Specification for Application of Siloxirane 2031)

Coverage

Practical at recommended film thickness (12-14 mils DFT) - 75-80 square feet per gallon.

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:

5 gallon (19 liters) kit with catalyst

1 gallon (4 liters) kit with catalyst

Zvn 27

Specific Use

Heat Cure

2431

PROTECTIVE LINING FOR
ABRASION RESISTANT SERVICE AT HIGHER TEMPERATURES

DESCRIPTION

Siloxirane® 2431 is an abrasion resistant heat cured polymer lining system. Siloxirane 2431 is a tough, flexible lining designed to handle the abrasiveness of coal, ore, plastic pellets and other media.

Siloxirane 2431 has excellent chemical resistance capable of withstanding the corrosive attack that normally comes with media handled.

Siloxirane 2431EA is for extreme abrasion resistance, modified for services handling fly-ash, oxides, crystals and other abrasive type slurries at temperatures up to 400° F (204° C). Build up to 125 mils by trowelling.

APPLICATION HIGHLIGHTS

- Can be applied to pitted corroded steel surfaces — surface tolerant
- Very high abrasion resistance
- High build
- Low temperature heat cure 300° F (150° C)
- Low VOC - 102 grams/L (0.85 lbs. per gallon)
- Excellent adhesion
- Flexible to take vibration and twisting
- Easily patched by maintenance personnel
- Steam cleanable
- Complies with FDA 21 CFR 175.300
- Resists Hydroblasting

CHEMICAL RESISTANCE

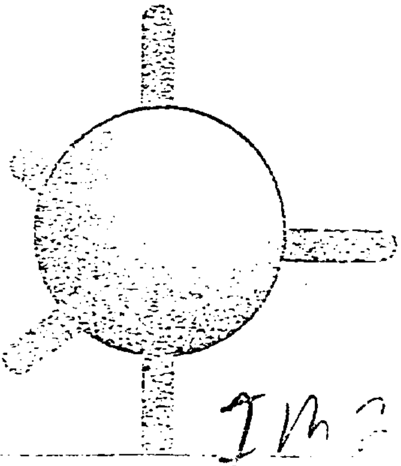
Sulfuric acid to 98%, most solvents including methylene chloride, MEK, methanol, gasohol, distilled water, inorganic acids, dilute organic acids and alkalis. Ideal for corrosive vapor environments.

INDUSTRY APPLICATIONS

- Slurry pipes
- Ducts
- Pumps
- Coal chutes, etc.

TYPICAL PROPERTIES

Color (Normal)	Oyster White
Weight/Gallon	12.5 lbs.
V.O.C. Level/Gal	102 grams/L (0.85 lbs./gal.)
Lead Content	Zero
Pot Life	8 hours at 80° F (27° C) 5 Gals. - 30 mins.
Viscosity Reduction	Reduce with MEK
Flash Point	127° F (53° C)
Solids by Volume	91.0%
Solids by Weight	97.0%
Chromate Content	Zero
Practical Coverage (sq. ft. per gallon)	70
Recommended Film Thickness (dry) mils	20 - 22 mil average
Shelf Life	1 year min at 75° F (24° C)



IM 31

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ADVANCED

2032

PROTECTIVE LINING FOR SUPERIOR CORROSION RESISTANCE WITH EXCEPTIONAL TOUGHNESS

DESCRIPTION

Siloxirane® 2032 is a two component, ambient or low temperature force cure, multifunctional cross linked organic-inorganic thermoset polymer coating.

Siloxirane 2032 provides superior resistance to:

- Acids, alkalis, and solvents
- Thermal shock -40° F (-40° C) to +400° F (204° C)
- Flex stressing
- Wear abrasion
- Impact
- Under creep corrosion

INDUSTRY APPLICATIONS

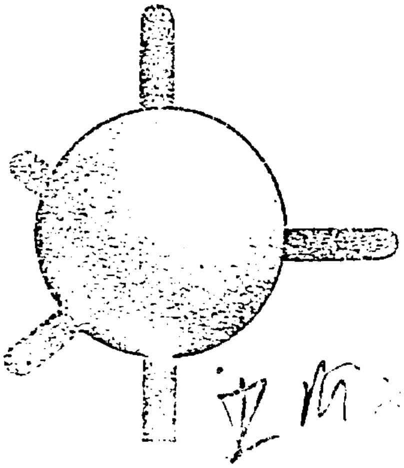
- Chemical Processing - Tanks, Reactor Vessels, Hazardous Waste Hauling, etc.
- Paper & Pulp - Digesters, Black Liquor Tanks, Bleaching, etc.
- Power Generation - FGD Systems, Ducts, and Stacks, etc.
- Steel - Pickling Tanks, Acid Storage, Acid Waste Neutralization, etc.
- Mining - Acid Tanks, Scrubbers, etc.

APPLICATION HIGHLIGHTS

- Superior bonding qualities
- Applied to pitted corroded steel
- Maximum versatility
- Rapid recoat intervals
- Ambient or low temperature force cure
- Very low VOC - 108 grams/L (0.9 lbs. per gallon)
- Outstanding toughness
- Non-permeable
- Steam cleanable
- Resists hydroblasting
- Repairable
- Sunlight resistant
- Coefficient of thermal expansion equal to stainless steel
- Complies with FDA 21 CFR 175.300
- Long pot life
- No primer required

TYPICAL PROPERTIES

Color (Normal)	Oyster White
V.O.C. Level	103 grams/L (0.9 lbs. /gal).
Lead Content	Zero
Chromate Content	Zero
Pot Life	120 Minutes @ 75° F (24° C)
Viscosity Reduction	Reduce with MEK
Flash Point	127° F (53° C)
Solids by Volume	89.6%
Solids by Weight	95.5%
Practical Coverage	96 sq. ft. per gallon at 12 mils DFT
Recommended DFT	12 mils average
Shelf Life	12+ months



PHYSICAL PROPERTIES

■ Tensile Strength (@75° F) (ASTM D538)	13,240 p.s.i.
■ Flexural Strength	13,443 p.s.i.
Flexural Modulus (ASTM D790)	979 k.s.i.
■ Water Absorption (30 Days @85° F) (ASTM D570)	0.09%
■ Permeability (Vapor Transmission of Water at 90° C for 7 days)	0.0000 gm. (per sq. ft. per 7 days per inch thickness)
■ Coefficient of Thermal Expansion -50° C to 150° C (ASTM D696)	19 (in./in./°C x 10^{-6})
■ Adhesive Strength	2850 p.s.i.
■ Elongation	6.2%
■ Hardness	70-75 Barcol
■ Impact Resistance (ASTM D2794)	120 in/lbs

APPLICATION DATA

Note: Detailed instructions are provided separately for Siloxirane coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone, MEK

Limitations

Apply when the air and surface temperatures are above 15° C (60° F). Relative humidity must be kept at 70% or lower. For optimum application properties, bring material to 20-25° C (68-77° F) prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Airless spray equipment with minimum 40:1 pump ratio @80-100 lbs. to achieve 3000-3500 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 1/4" x 15 meter whip hose, with a maximum length of 30 meters. This coating is a low VOC compliant material. If shop conditions require a viscosity adjustment, thin with MEK.

Recoat Time (Per Coat)

Temp. Deg. C.	Overcoat Minimum	Overcoat Maximum
15	*18 Hrs.*	*10 Days*
20	*14 Hrs.*	*9 Days*
25	*14 Hrs.*	*9 Days*
30	*8 Hrs.*	*7 Days*
35	*8 Hrs.*	*6 Days*
40	*6 Hrs.*	*5 Days*

Cure Time And Temperature

When application of the complete coating system has been approved, the coating can be cured by electrically heated air or indirectly combustion heated air only.

13 Days at 20° C (68° F) or,
9 Days at 30° C (86° F) or,
6 Days at 40° C (104° F) or,
10 Hrs. at 50° C (122° F) or,
6 Hrs. at 60° C (150° F) or,
4 Hrs. at 82° C (180° F).

All temperatures are minimum steel substrate temperatures.

(See full Specification for Application of Siloxirane 2032.)

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:

5 gallon (19 liters) kit with catalyst

1 gallon (4 liters) kit with catalyst

S U. Heat Cure

VANCED
ENCES

2432

PROTECTIVE LINING FOR ABRASION RESISTANT SERVICE

DESCRIPTION

Siloxirane® 2432 is an abrasion resistant two component ambient cured polymer lining system. Siloxirane 2432 is a tough, flexible lining designed to handle the abrasiveness of coal, ore, plastic pellets, ice flows and other media.

Siloxirane 2432 has excellent chemical resistance capable of withstanding the corrosive attack that normally comes with media handled.

APPLICATION HIGHLIGHTS

- Can be applied to pitted corroded steel surfaces — surface tolerant
- Very high abrasion resistance
- High build
- Ambient cure
- Resists ice abrasion
- Low VOC - 102 grams/L (0.85 lbs. per gallon)
- Excellent adhesion
- Flexible to take vibration and twisting
- Easily patched by maintenance personnel
- Steam cleanable
- Complies with FDA 21 CFR 175.300
- Resists hydroblasting

CHEMICAL RESISTANCE

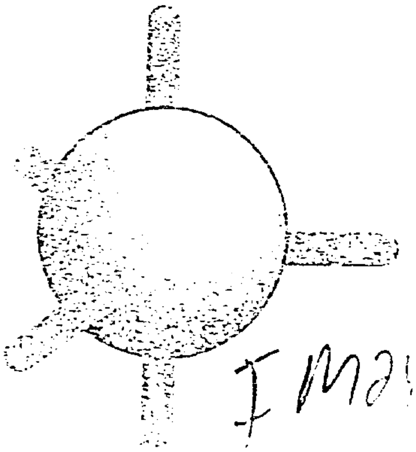
Sulfuric acid to 98%, most solvents including methylene chloride, MEK, methanol, gasohol, distilled water, inorganic acids, dilute organic acids and alkalis. Ideal for corrosive vapor environments.

INDUSTRY APPLICATIONS

- Hopper cars
- Slurry pipe
- Legs of oil platforms
- Pumps
- Underwater areas of ships for resisting ice abrasion
- Small boats and yachts to resist sand abrasion

TYPICAL PROPERTIES

Color (Normal)	Light Gray
Weight/Gallon	12.5 lbs.
V.O.C. Level/Gal.	102 grams/L (0.85 lbs./gal.)
Lead Content	Zero
Pot Life	120 mins @ 75° F (24° C)
Viscosity Reduction	Reduce with MEK
Flash Point	127° F (53° C)
Solids by Volume	91.0%
Solids by Weight	97.0%
Chromate Content	Zero
Practical Coverage (sq. ft. per gallon)	70
Recommended Film Thickness (dry) mils	22 mils average
Shelf Life	1 year min at 50-90° F (10-32° C)



J Mayo

APPLICATION DATA

Note: Detailed instructions are provided separately for Siloxirane coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone, MEK

Limitations

Apply when the air and surface temperatures are above 50° F. Surface temperatures must be at least 5° F above the dew point. For optimum application properties, bring material to 70-90° F prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Siloxirane 2432 — Airless spray equipment with 30:1 pump ratio @80-100 lbs to achieve 2400-3000 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 3/16" by 6' whip hose, with a maximum of 100 linear feet. This coating is a low VOC compliance material. If shop conditions require a viscosity adjustment, thin with MEK.

Cure Time And Temperature

(A) Curing at Elevated Temperatures: Blow air over lining for 2 hours to remove solvent prior to curing. Raise temperature of metal substrate 50° F per hour. Maintain at 180° F for 4 hours.

(B) Curing at Ambient Temperatures: The temperature should be 60° F or above. Lining will lose tackiness and become hard in 2 to 4 hours, depending on the prevailing temperature. Full curing will occur in 2 to 7 days, depending on temperature.

Coverage

Practical at recommended film thickness:

2432 — (20-22 mils DFT)
70 sq. ft./gal.

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:
5 gallon (19 liters) kit with catalyst
1 gallon (4 liters) kit with catalyst

J May

ADVANCED
SCIENCES

LINE

PROTECTIVE LINING FOR SUPERIOR CORROSION AND HIGH TEMPERATURE RESISTANCE WITH EXCEPTIONAL FLEXIBILITY AND TOUGHNESS

DESCRIPTION

PowerLine® coating is specially formulated with Siloxirane® polymer resin for handling the high temperature and abrasion requirements of the power industry. PowerLine® is a two-component force cure system that offers unique characteristics. PowerLine is a cross-linked organic-inorganic multifunctional polymer coating that is cured though homopolymerization. This dense crosslinked polymer exhibits high flexibility and toughness, having no detrimental hydroxyl or ester groups. Due to PowerLine's temperature resistance (500° F/260° C), it provides superior resistance to:

- ☐ Acids, alkalis, solvents, oxidizing agents
- ☐ Thermal shock -40° F (-40° C) to +500° F (+260° C)
- ☐ Flex stressing
- ☐ Wear and abrasion
- ☐ Impact

APPLICATION HIGHLIGHTS

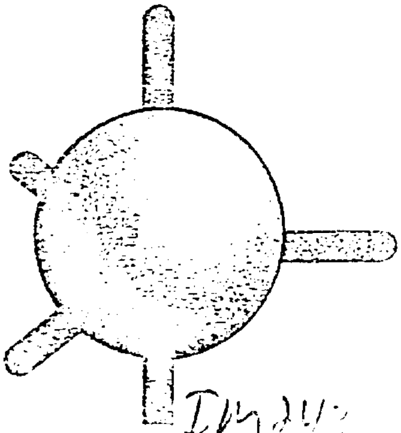
- ☐ Resists fly ash abrasion
- ☐ Low coefficient of thermal expansion
- ☐ Very high bond strengths 5200 PSI on grit blasted steel
- ☐ Smooth, low surface energy reduces fly ash buildup in ducts and stacks
- ☐ Applied to pitted corroded steel
- ☐ Very low VOC - 108 grams/L (0.9 lbs. per gallon)
- ☐ Outstanding flexibility
- ☐ Non-permeable
- ☐ Steam cleanable
- ☐ Resists hydroblasting
- ☐ Repairable
- ☐ Sunlight resistant
- ☐ Coefficient of thermal expansion equal to stainless steel
- ☐ Resists high voltage

INDUSTRY APPLICATIONS

- ☐ Stacks
- ☐ Chimneys
- ☐ Ducts
- ☐ Flu gas desulfurization scrubbers
- ☐ Chemical scrubbers
- ☐ Pre-scrubbers
- ☐ Spray towers
- ☐ Fans

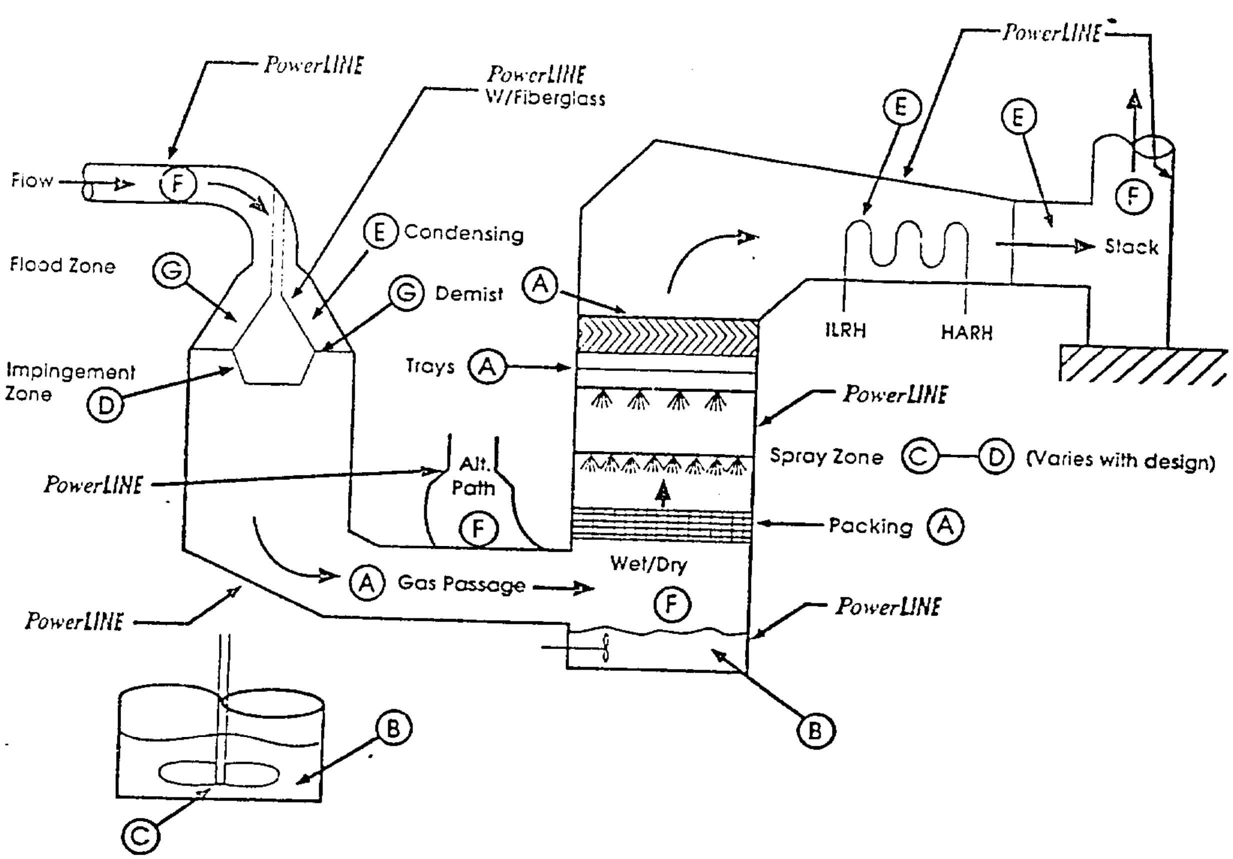
TYPICAL PROPERTIES

☐ Color (Normal)	Oyster White (Can be pigmented)
☐ V.O.C. Level	108 grams/L (0.9 lbs. /gal.)
☐ Lead Content	Zero
☐ Chromate Content	Zero
☐ Pot Life	120 min. @ 75° F (24° C)
☐ Viscosity Reduction	Reduce with MEK
☐ Flash Point	127° F (53° C)
☐ Solids by Volume	90%
☐ Solids by Weight	95.5%
☐ Practical Coverage	78 sq. ft. per gallon at 14 mils DFT
☐ Recommended DFT (1-2 coat application, see directions)	14 mils dry average 16-18 mils wet
☐ Shelf Life (Unopened can)	12 months



DM247

Typical FGD Schematic (non-denominational) Showing Various Lining Zones for PowerLine

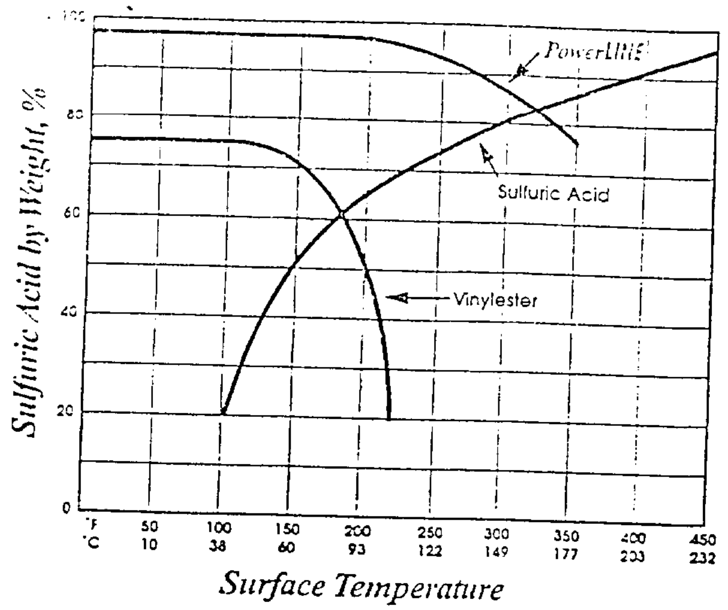


Explanation of Above Codes Used to Define Lining Environment

Code	Chemistry	Mechanical Environment	Temp	Recommendation
A	Mild Corrosive (Vapor)	Mildly Abrasive	High	PowerLine
B	Moderate (Immersion)	Mild	Mild	PowerLine
C	Moderate	Moderate	Mild	PowerLine
D	Moderate	Severe	Mild	PowerLine
E	Severe	Mild	Moderate	PowerLine
F	Severe	Mild	Severe	PowerLine
G	Severe	Severe	Severe	PowerLine

Environmental Severity Level

1) *Temperature - Mild 93°C (200°F) to 177°C (350°F) (Severe)*
2) *Corrosion - Mild 30% to 80% Sulfuric Acid (Severe)*
3) *Erosion - High Energy Fly Ash Particles*



PowerLine vs. Vinylester at Temperatures and H_2SO_4 Concentrations Found in Ducts and Stacks

APPLICATION DATA

Note: Detailed instructions are provided separately for PowerLine coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone, MEK

Limitations

Apply when the air and surface temperatures are above 50° F. Surface temperatures must be at least 5° F above the dew point. For optimum application properties, bring material to 70-90° F prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Airless spray equipment with 45:1 pump ratio @80-100 lbs. to achieve 2400-3000 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 3/16" by 6' whip hose, with a maximum of 100 linear feet. This coating is a low VOC compliant material. If shop conditions require a viscosity adjustment, thin with MEK.

Cure Time And Temperature

Curing: Blow air over lining for 2 hours to remove solvent prior to curing. Raise temperature of metal substrate 50° F per hour. Maintain at 350° F (177° C) for 4 hours.

(See full Specification for Application of PowerLine)

Coverage

Practical at recommended film thickness (12-14 mils DFT) - 75-80 square feet per gallon.

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:

5 gallon (19 liters) kit with catalyst

1 gallon (4 liters) kit with catalyst

Specialized Application Equipment

Ameron

Amercoat® 428PC

100% solids epoxy

Product Data

- High build
- High performance maintenance coating for new and old steel
- High gloss, easily cleaned
- Good chemical and corrosion resistance
- Meets VOC requirements
- More flexible and abrasion resistant than conventional epoxy coatings

The 100% solids characteristic of Amercoat 428PC reduces the chances of pinholing and solvent entrapment at the substrate coating interface, often a major cause of coating failure with conventional epoxies and lower solids systems.

Typical Uses

- Lining for hopper cars and barges carrying dry bulk chemicals, plastic pellets and dry bulk edibles
- Industrial facilities, bridges, tank exteriors, rail cars
- Marine and offshore exposures
- Waste water treatment facilities, piping, roofs, oil tanks
- Good resistance to fumes and splash/spillage of many chemicals. Contact your Ameron representative for specific information.

Systems Using Amercoat 428PC

Maximum topcoat time limitation @ 70°F (21°C)

1st Coat	2nd Coat	Max. Topcoat Time
428PC	None	–
83HS	428PC or 5401HSA	2 days
428PC	Amershield™	7 days
428PC	450HS	3 days
428PC	428PC	21 days

Chemical Resistance Guide for Amercoat 428PC

Environment	Splash and Spillage	Fumes and Weather
Acidic	F	G
Alkaline	E	E
Solvents	G	E
Salt Water	E	E
Water	E	E

F-Fair G-Good E-Excellent

Physical Data

Finish	Gloss	
Color	White, pearl gray, oxide red, ivory, light blue, medium gray, black, bahama beige, gray	
Components	2	
Curing mechanism	Chemical reaction between components	
Volume solids (calculated)	100%	
Dry film thickness per coat	6 to 12 mils (150-300 microns)	
Coats	1 or 2	
Theoretical coverage	ft²/gal	m²/gal
1 mil (25 microns)	1604	39.4
12 mils (300 microns)	133.7	3.3
VOC mixed	0.0 lb/gal	0.0 g/L

Temperature resistance	Dry	
	°F	°C
continuous	200	93
intermittent	250	121

Flash point (SETA)	°F	°C
428PC cure	>212	>100
428PC resin	>212	>100
Amercoat 928*	175	79
Amercoat 12	0	-18
Amercoat 65	78	25

Application Data

Applied over	Steel, concrete, aluminum
Surface preparation	Abrasive or water blast, mechanical cleaning
Method	Plural component heated airless spray
Mixing ratio (by volume)	1 part resin to 1 part cure

Potlife (hours)	°F/°C 90/32	 70/21	 50/10
Amercoat 428PC	1/4	1/2	1

Environmental conditions

Temperature	°F	°C
air and surface	40 to 120	4 to 49
material	130 to 165	54 to 74

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation.

Cure at 50°F minimum – may be exposed to temperature below 50°F during cure, but cure time will be extended.

**Use of Amercoat 928 avoids generation of hazardous waste.*

Formerly Amercoat 320SPC

IM 251

Specialized Application

POLYQuik®
SPRAY POLYUREA COATINGS

POLYQuik® spray polyurea products are tough, fast-curing coatings that offer excellent abrasion, corrosion and chemical resistance with a 100% solids content.

Why Use POLYQuik®

- Sets in seconds to reduce facility downtime
- No topcoat required
- Meets air quality regulations with solvent-free performance
- Excellent chemical resistance
- Versatility for use throughout the entire plant
- May be used in temperature and weather extremes
- Available in a variety of colors

Where to Use POLYQuik®

Secondary containment coatings: gasoline and other fuels, oils, liquid fertilizers, solvents, and other chemical products

Protective coatings: concrete, asphalt, wood, steel and other metals, for use in wastewater facilities, mines, and railcars

Abrasion resistant coatings: industrial flooring, truck beds, and mines

Surface Preparation

The surface to be coated must be clean and dry with all loose substrate and rust removed. The following preparation standards are required prior to applying POLYQuik:

Steel–SSPC-SP10, SSPC-SP6

Asphalt–free of oil and grease, air blasted to remove loose product

Concrete–abrasive blasting or water blasting, remove oil and grease prior to blasting

Metals–SSA-SP1 solvent clean and brush off blast

Geotextiles–minimize wrinkles

Other–Contact your POLYQuik Sales Representative

Application Parameters

Theoretical Coverage Per Gallon–1600 square feet

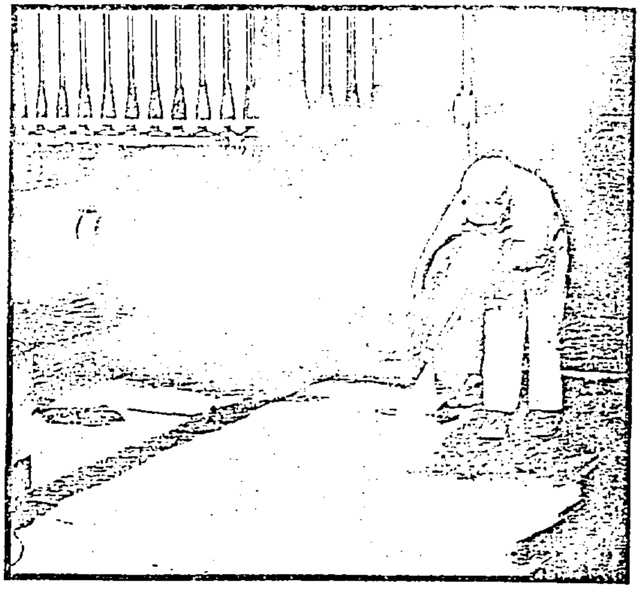
Application Equipment

- Gusmer Models H-3500 or Marksman
- Gusmer GX-7 spray gun
- 40KW generator
- Air compressor

Note: Physical properties of POLYQuik are affected by application temperature and system air pressure. POLYQuik requires a minimum pressure of 2200 psi and a minimum spray temperature of 150°F.

Surface Temperature

A minimum temperature of 40°F is required unless otherwise approved by a POLYQuik Sales Representative



Application to Wet Surfaces

POLYQuik will cure completely on wet substrates with no pinholes. However, check with your POLYQuik Sales Representative for further details before application on damp substrates.

Recoating

Recoating, if necessary, should be done within the first 12 hours after the initial application.

- After 12 hours, soften the entire surface of the coating with Acetone or MEK, wipe substrate dry, then apply the additional layer(s) of POLYQuik. Abrading the surface may also be necessary to achieve a proper surface for application.
- If more than 12 hours elapses before the initial coating is completely applied, you may prepare just a one foot strip of the edge of the portion previously sprayed as instructed above. Then, continue spraying the remainder of the uncoated application area.

Storage and Handling

Store POLYQuik at 60–90°F in a low moisture environment. Do not store outside. Storage at lower than 60°F will result in damage to the product and may adversely affect performance. Avoid excessive exposure to isocyanate or A component. If either A or B component comes in contact with skin, rinse thoroughly with water (see Material Safety Data Sheet). Shelf life is approximately one year. Storage in extreme conditions may lead to a decrease in shelf life.

POLYQuik® Characteristics

Color	Black, white, or gray, custom tints available
Solids	100% by volume
VOC	0
Mix Ratio	1:1 by volume
Gel Time	5 seconds
Tack-Free Time	20 seconds
Cure Time	12 hours minimum; 24 hours preferred
Chemical Resistance	Excellent

Fld Service Supplier Tech Articles

Evan

NEW TECHNOLOGIES for Ultralow-VOC Polyurethane Coatings

As formulators decrease the level of VOCs in two-part, solventborne polyurethane coatings, they have to contend with a number of handling and application difficulties. This article presents two new technologies that work together to solve these problems.

Two-part, solvent-based coatings systems using aliphatic isocyanates and polyester or acrylic polyols have become the industry standard for weatherable topcoats. These coatings systems combine resistance to chemical and physical damage with high gloss levels and long-term retention of gloss, color and mechanical properties. Traditionally, these coatings systems have been formulated with a liquid polyisocyanate as one component and a high-molecular-weight, high-functionality polyol along with associated pigments and additives as the second component.[1]

A driving force in the reformulation of coatings is the need to reduce solvent emissions on application. One disadvantage of conventional polyurethane formulations is the high solvent demand of the polyol component. This factor has limited the volatile organic compounds (VOCs) reduction available with traditional polyol systems.

One route to lowering VOCs is to use lower-molecular-weight polyols. As formulators have incorporated more lower-molecular-weight (lower-viscosity) polyols into their systems, there has been an inevitable trade-off in the physical properties of the resulting coatings and/or handling of the reactive mixture.

Many low-VOC polyurethane coatings suffer from poor solvent resistance, poor flexibility and an extreme sensitivity to catalyst level as it affects the cure profile. In addition, with less solvent in the formulation and fewer ingredients to manipulate, maintaining convenient mixing ratios has also been a struggle.

Studies described in this article demonstrate using two technologies developed to help solve these formulating problems. One technology is a process to make narrow-molecular-weight-distribution, isocyanate-terminated polyurethane prepolymers. A second technology is the creation of ultralow-viscosity oxazolidine and aldimine oxazolidine reactive diluents. Using these materials, developed specifically for use in high-solids, polyurethane coatings, directly achieves the following benefits:

- formulating to low VOCs (down to 2.08 lb/gal, conventionally applied)
- controlling reactivity of low-VOC systems
- enhancing coating performance; and
- attaining formulation flexibility and ease of use

The data presented here describes these technologies in more detail and shows how using them, both separately and together, provides new tools for polyurethane-coatings formulators.

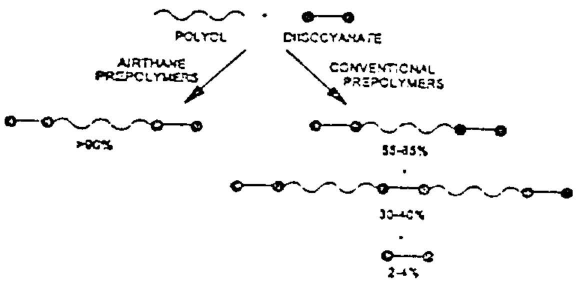
By **Sherri L. Bassner**
Senior Principle Applications Chemist
Chemicals Technology Group
Air Products and Chemicals Inc.
Allentown, Pa.
and **Thomas Johnson**
Commercial Development Manager
ANGUS Chemical Co.
Buffalo Grove, Ill.

Polyurethane Prepolymers

Polyurethane prepolymers have been used in certain segments of the coatings, adhesives, sealants and elastomer industries for many years.[2] By forming a prepolymer, diisocyanate-monomer content is reduced, and the reactivity of this partially reacted system is easier to control. These prepolymers, however, have limited use in higher-solids coatings formulations.

The traditional synthesis process typically involves the exothermic reaction of one equivalent of polyol with two equivalents of diisocyanate monomer. The desired end-product, the isocyanate-capped polyol, makes up only about half of the final product mixture's weight. Using this process, many of the diisocyanate monomer molecules react through both isocyanate groups, creating high-molecular-weight oligomers. These oligomeric species, which can be much larger than the simple 3:2 diisocyanate-polyol adduct shown in Figure 1, lead to high solvent demand, relatively short pot lives and poor sprayability in prepolymer-based coatings formulations.

Fig. 1 Airthane® Versus Conventional Technology



New technology, which is described in other data sheets,[3-6] has made available polyurethane prepolymers (under the tradename Airthane® prepolymers) that have half of the viscosity of their counterparts and extremely low diisocyanate monomer levels (<0.1% for aromatic isocyanates and <1% for aliphatic isocyanates). These materials, made by a process that keeps the oligomer content very low, have the lower solvent demand and favorable pot life/dry time balance needed for high-solids formulating.

Reactive Diluents

Reactive diluents are low-viscosity co-reactants designed to lower the VOCs in coating systems. While they generally reduce the viscosity of the polymeric composition similar to a solvent, they must also undergo reaction with polyisocyanates to effectively reduce VOCs. Reactive diluents should not be confused with high-boiling solvents or solvated polyols.

The ideal reactive diluent for a solventborne polyurethane coating should possess the following traits:

- low intrinsic viscosity;
- good solubility/solvency;
- relatively high equivalent weight;
- reasonable pot life/cure response, and
- good film performance/weathering.

There are a myriad of products in the industrial-coatings marketplace that are being promoted as reactive diluents for high-solids polyurethane coatings. Very few measure up to the stringent definition above. Examples of reactive diluents currently in use include low-molecular-weight diols/polyols, hindered amines, aldimines, ketimines and oxazolidines.

Polyester and acrylic polyols are polymers that can be easily crosslinked with polyisocyanates to produce highly durable coatings. Unfortunately, the high molecular weight and hydroxyl functionality that make these resins so attractive also inherently lead to high intrinsic viscosities. As solvent content is reduced in polyurethane coatings containing these workhorse polyols, system viscosities rapidly rise above a desirable range for most applications.

One way to solve this problem is to use lower-molecular-weight polyols or even diols in a polyurethane system. Unfortunately, as the polyol backbone is reduced, so are many of its performance qualities.[7] Some of these polyols contain significant amounts of low- (or no-) functionality oligomers, leading to coatings with poor chemical resistance. Others are very highly functional, leading to coatings with poor mechanical properties.

The trade-off between polyol molecular weight and system performance seriously hinders sole reliance on this technology for achieving VOC compliance. Most high-solids polyols are sold as 60% to 80% weight solutions with intrinsic viscosities well above 5,000 centipoise.

Amino compounds can serve as an alternative to polyols in two-component polyurethane industrial coatings. Amines react quite readily with polyisocyanate to yield polyureas. Amines are also much lower in intrinsic viscosity than polyols, making them very effective reactive diluents. Unfortunately, the reaction between amines and isocyanates is so rapid that these diluents are generally not practical unless plural-component application equipment is used. One exception may be some of the recent hindered amines based on polyaspartic ester technology.[5]

Ventura County Air Pollution Control District
669 County Square Drive
Ventura, California 93003
tel 805/645-1400
fax 805/645-1444
Richard H. Baldwin
Air Pollution Control Officer

April 4, 2000

Jim Nyarady, Manager
Strategy Evaluation Section
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Draft Program Environmental Impact Report - Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

11-1 Ventura County Air Pollution Control District (APCD) staff has reviewed the Draft Program Environmental Impact Report (EIR) for the Air Resources Board's (ARB) Suggested Control Measure (SCM) for Architectural Coatings. District staff finds the Draft Program EIR to be thorough and accurate, and concurs with the conclusions made in the EIR with respect to significance of impacts. The certification of this Program EIR by the ARB will assist local air districts by providing a document that each district may incorporate by reference in whatever CEQA documents they intend to prepare for their own local architectural coating rules.

After reviewing the EIR, District staff offers the following comments:

General Comments:

11-2 VOC Content Calculations
The "VOC content" of coatings is presented in several tables throughout the text of the EIR. In some instances, the VOC content is expressed as grams per liter of material, less water and exempt solvents (for example, in Table II-3). In other instances, the method of calculating VOC content is not indicated (for example, in Tables II-2, IV-2, and IV-3). The two calculation methodologies for VOC content (presented in Section 6.1 of the SCM) can yield significantly different values. Therefore, in each instance where the VOC content of coatings is presented, the calculation methodology should be clearly indicated. Based on the information presented in Table II-3 of the EIR, it is not clear how the anticipated VOC emission reductions were calculated.

11-3 Consistency With Air Quality Plans
The Executive Summary (Page I-7, Section 4.a.) states that "air quality impacts are considered significant if the proposal would conflict with or obstruct implementation of the applicable air quality plan." However, the discussion of "Significance Criteria" presented in Section IV.C.1. (Page IV-61), does not include a discussion of "Consistency" with air quality plans. Instead, the

11-3 matter of "Consistency" is deferred to a later section in the EIR (Section IV.F.), which is not discussed in the Executive Summary. District staff suggests that either the "Consistency" discussion be included in the "Air Quality Impacts" section of the EIR, or that the Executive Summary be revised to reflect the actual format and content of the text in Section IV of the EIR.

11-4 Air Quality Impacts

The discussion of air quality impacts (Section IV) includes an extensive analysis of potential negative air quality impacts attributable to the proposed SCM. The "Project Description" section (Section II) of the EIR details the purpose of the SCM, and discusses the reduction of VOC emissions statewide as a result of implementation of the SCM. However, the positive air quality impacts that are anticipated to result from implementation of the SCM are discussed very little within the text of Section IV. District staff suggests that Section IV include a more detailed discussion of the positive air quality impacts, such as the reduction of VOC emissions and subsequent lowering of ambient ozone concentrations on a statewide basis.

Specific Comments:

11-5 Page IV-60, Section IV.B., Thresholds of Significance

The third sentence of the second paragraph on this page states that SCAQMD's significance criteria tend to be the most conservative. It should be noted that Ventura County APCD's significance thresholds are more conservative at 25 lb/day for ROC (VOC) and NOx for most of the county, and 5 lb/day for the Ojai Planning Area portion of the county.

11-6 Page IV-82, Section IV.C.1., "Overall Conclusion"

The "Overall Conclusion" discussion indicates that the SCM will result in statewide VOC emission reductions of approximately 14 tons per day (excluding the SCAQMD) by the year 2004. This statement conflicts with the figure of approximately 11 tons per day presented in Table II-3 and in the second paragraph on Page IV-61.

If you have any questions, please call Molly Pearson of my staff at (805) 645-1439.

Sincerely,

Scott Johnson, Manager
Planning and Evaluation Division

c. Dick Baldwin, Ventura County APCD
Mike Villegas, Ventura County APCD

m:\planning\ceqa\dpeir for carb scm – architectural coatings

GOLDEN
ARTIST COLORS

Golden Artist Colors, Inc.
New Berlin, NY 13411 USA
Phone: 607-847-6154
Fax: 607-847-6767

April 5, 2000

Mr. Jim Nyardy, Manager, Strategy Evaluation Section
Stationary Source Division
Air Resources Board
2020 L St., PO Box 2815
Sacramento, CA 95812

RE: Comments on Draft EIR
FROM: Ben Gavett, Director of Safety and Compliance, Golden Artist Colors, (607)847-6154

Thank you for the opportunity to comment on this draft. My comments are specific to the Faux Finishing Category. We are requesting that the Proposed Limit be changed from 350 g/l to 700 g/l. The 350 g/l limit is insufficient because the faux finish products currently on the market that are below this level do not meet the performance criteria for professional faux finishers. I have attached comments from professionals who have used the various products mentioned in the Draft EIR, Appendix D. The 700 g/l limit would also be consistent with the federal EPA's Architectural Coatings rule.

12-1 The ARB believes that a product at 350 g/l has the same open time as a product at 700 g/l (response to Issue #1, page 34, Appendix D). No basis is provided for this statement, but we expect that the information was gleaned from product labels and literature. Rather than rely on *reported* open times from the various manufacturers mentioned in Appendix D, we are submitting results of side by side comparisons and testing where the materials are evaluated under identical conditions. As could be expected, the amount of open time is directly proportional to the VOC level. The low VOC products tested, with reported VOC up to 350 g/l, had 7-10 minutes open time on the edges. A wet edge is critical for doing these techniques, in order to be able to blend one work area into the next. Golden Glazing Liquid was open for 20 minutes. Perhaps the simplest of techniques can be accomplished with products having the shorter open times. However, more sophisticated finishes require more steps and even 20 minutes challenges finishers trying to minimize work area while maintaining the proper scale and continuity of the pattern.

In summary, while there are faux finishing glazes on the market that are under 350 g/l, they often do not meet the open time requirements professional finishers need (see attached comments). Since these coatings do represent a minor percentage of the overall sales from architectural coatings, the impact of accommodating these needs is relatively insignificant.

From: "Pat Pangburn" <pangburn@utm.net>
To: "Laurie H." <LaurieJill@aol.com>, <Ben@goldenpaints.com>
Date: 4/5/00 9:18PM
Subject: Fw: Golden Acrylic Glazing Liquid

-----Original Message-----
From: Roger Pangburn <rpangbur@utm.net>
To: jnyarady@arb.ca.gov <jnyarady@arb.ca.gov>
Date: Wednesday, April 05, 2000 6:17 PM
Subject: Golden Acrylic Glazing Liquid

Dear Mr. Nyarady

I have been informed that you are the person at the Air Resources Board to contact concerning a problem I have been having obtaining the acrylic glazing liquid manufactured by Golden Paints.

Yes, I can purchase it here in San Diego County - but only in quart bottles. I need it a gallon at a time for use as a professional faux finisher. I have tried various other water-based glazing products that are sold here by the gallon (Benjamin Moore, McCloskey's, Behr,etc.) with less than perfect results for the faux finishes that I use in my business.

I have been informed that the reason I can't get this product by the gallon has something to do with "air quality" problems during the drying period. Frankly, I personally have never noticed the least problem working with this product, and I have worked with it a lot over a five year period. It doesn't come close to the toxicity that is obviously apparent in many other products commonly used on construction sites where I have worked (i.e. Bondo, lacquer, lacquer thinner, paint thinner, acetone, ammonia, denatured alcohol and various other solvents and sealers.)

If there is anything you can do to put this benign and superior product back on the San Diego store shelves in gallon containers, I would really appreciate it. (It is costing me a fortune to by it by the quart!!!!)

Thank you for your time and consideration of this problem.

Pat Pangburn : pat@thepangburns.com

From: <LaurieJill@aol.com>
To: <jnyarady@arb.ca.gov>
Date: 4/5/00 1:40PM
Subject: Golden Glazing Liquid

Dear Mr. Nyarady,

I am a faux finisher working in San Diego County. My partner and I have been professionals in this field for over 6 years and do high quality decorative work in very expenseive homes. We have found Golden Glaze to be a superior glazing compound for our finishes. We have tried other brands such as McCloskeys and Benjamin Moore and find them to be less useful in texture and flow than the Golden. The Golden Glaze is the only one that accomplishes acceptable finishes over flat latex paint allowing us to go over many existing walls without having to repaint with an eggshell or lo-sheen paint, thereby saving the homeowner from the expense and time of having to repaint their walls in order to get what they want.

We have never understood why this high quality product is not available in gallons. I can walk into Home Depot and buy a gallon of lacquer thinner but I can't buy this product anywhere.

We respectfully request that you consider selling this product by the gallon because it is a superior glaze unlike any other on the market.

Thanks for you consideration.

Laurie Hansley

CC: <Ben@goldenpaints.com>

Department of Water and Power the City of Los Angeles

RICHARD J. RIORDAN
Mayor

Commission
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JOHN C. BURMAHLN, *Secretary*

S. DAVID FREEMAN, *General Manager*

April 6, 2000

Mr. Dean C. Simeroth, Chief
Criteria Pollutants Branch
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Dear Mr. Simeroth:

Comments on
Suggested Control Measure for Architectural Coatings (SCM)
Los Angeles Department Of Water And Power (LADWP)

The LADWP appreciates having this opportunity to comment on the "Draft 2/11/00 strikeout/underline version from the 12/1/99 SCM." The LADWP has participated in workshops and has met twice with the California Air Resources Board (CARB) on the proposed SCM.

The LADWP provides water and electric service to the City of Los Angeles and has equipment located outside of the South Coast Air Quality Management District (SCAQMD) that would be impacted by the SCM. The LADWP understands the importance of reducing volatile organic compounds (VOC) emissions to atmosphere and looks forward to further working with the CARB to produce an SCM that is reasonable, effective, and is based on sound technical data. The following are the LADWP's comments.

Testing

13-1 As your staff knows, the LADWP is a participant with other "Essential Public Service Agencies (Agencies)" and the SCAQMD in a low VOC coatings test program (Test Program) required by an SCAQMD Board Resolution for its Rule 1113 – "Architectural Coatings." The purpose of this Test Program is to determine if low VOC coatings

13-1 (i.e., 100 and 250 grams/liter) perform adequately to protect against corrosion compared to the currently used higher VOC coatings. The LADWP feels that this Test Program is essential to justify a 250 grams/liter VOC limit for "Industrial Maintenance Coatings (IMCs)." As such, the LADWP recommends that the CARB formally recognize this Test Program in the final Environmental Impact Report for its SCM (in Section II-E – Development Of The SCM). LADWP feels that these test results are critical in determining the low VOC limits for IMCs and that other industries will be very much interested in the results.

Extension Of IMC Compliance Date

13-2 The LADWP supports CARB's decision to extend the compliance date for the IMC limit of 250 grams/liter from January 1, 2003 to January 1, 2004. The LADWP views 250 grams/liter as a low VOC limit and is concerned that coatings meeting this limit will not perform adequately. The additional year will provide more time to obtain the needed test data under the Agencies' Test Program. Although not all the testing will be completed by a July 2003 date (to provide enough time to revise the January 1, 2004 limit if needed), a substantial amount will be completed whereby a general performance trend will likely be established. The LADWP will appreciate the opportunity to discuss this test data with you at that time and will discuss any other aspect of the Test Program with you at any time.

Coatings Manufacturers' Product Data Sheets

13-3 The CARB indicated at the March 16, 2000 workshop that it is not in the business of testing coatings. Coating manufacturers recommended that CARB not necessarily rely on product data sheets provided by coatings manufacturers and made the point that some product data sheets can be viewed as sales brochures that present an overly optimistic view of the coating's performance. LADWP supports the coating manufacturers' recommendation and recommends that CARB review the test data from the test program mentioned above.

Coastal Areas

13-4 At the March 16 workshop, the CARB indicated that it is considering a higher IMC VOC limit for equipment located at coastal areas due to the highly corrosive salt air. LADWP supports this proposal and identified this issue in its June 11, 1999 letter to Mr. James E. Nyarady of CARB.

As stated in the June 11 letter, electric power generating stations are many times located at the ocean to use the ocean water as cooling water in the condensers. The condensers condense steam to liquid water to be pumped back to the boiler that heats the water to high-pressure steam to turn the turbines that turns the electric power generators. These generating stations have circuit breakers, transformers, voltage regulators, pumps, pipes, turbines, generators, tanks, structural steel, and related equipment that must be protected from corrosion with IMCs.

13-5

Quick-Dry IMC Primers

With respect to coating its electrical equipment (e.g., transformers), LADWP's policy is to return electric equipment to service within eight hours after taking it out of service. When the electric equipment is taken out of service to be coated in the field, power is interrupted that creates an inconvenience to residents and an economic burden to industry. LADWP has found that industry does not want its electric power interrupted for more than one-eight hour working shift every ten years because the down-time of its manufacturing plants will adversely impact their businesses. Therefore, LADWP desires to have a low VOC quick-dry primer (it currently uses a high VOC quick-dry primer) whereby it can coat the equipment with the primer, let it cure in a few hours, and be able to apply the top-coat so the equipment can be re-energized within the eight-hour shift. This coating system must then last for ten years.

The LADWP plans to test primers in the Test Program for their quick-dry characteristics as well as durability. If none pass both of these requirements, LADWP recommends that a higher VOC category be set aside for this application.

If you have any questions or comments, please contact me at (213) 367-0409 or Mr. Timothy L. Conkin at (213) 367-0443.

Sincerely,

Bruce M Moore

BRUCE M. MOORE
Supervisor
Air Quality Business Team

c: Mr. Donald J. Ames, CARB
Mr. James E. Nyarady, CARB
Mr. Michael P. Jaczola, CARB
Mr. Evan Wong, CARB
Ms. Barbara Fry, CARB
Mr. Naveen Berry, SCAQMD

Mr. Timothy L. Conkin

AMERON
Coatings

AMERON COATINGS
Headquarters
201 North Berry Street
P.O. Box 1020 (92822-1020)
Brea, California 92821

Telephone: 714/529-1951
Fax: 714/990-0437

Internet: www.ameroncoatings.com

April 7, 2000

Ms. Janette Brooks, Chief
CALIFORNIA AIR RESOURCES BOARD
Air Quality Measures Branch
Stationary Source Division
P. O. Box 2815
Sacramento, CA 95812

Dear Ms. Brooks:

This letter summarizes comments made at the March 16^{TH} public workshop on the proposed SCM for Architectural Coatings, Draft Impact Environmental Impact Report and provides additional comment on the Industrial Maintenance and Floor Coating categories.

1. Floor Coatings - We were considerably surprised by the change in the Industrial Maintenance Coating definition that excludes Floor Coatings and moves these products to be sold under the Floor Coating category at the substantially lower VOC limit of 100 g/l.

14-1 It is common practice in Industrial Maintenance painting to use the same coating that is specified for the structural steel and concrete walls of any given facility on the floors as well. ARB has already made the determination that 250 g/l is a suitable goal for the Industrial Maintenance category. Since the floors of any given facility are subject to the same environment as the structural steel and concrete walls as well as abrasion, spills and various types of cleaning, one might reasonably argue that service or exposure conditions are more severe for Floor Coatings than for Industrial Maintenance.

In the Environmental Impact Report, Appendix D, Page 41 section Proposed VOC Limit and Basis for Recommendation, the basis for recommending 100 gm/l includes complying market share; however, we believe the survey results do not cover all coatings used under the new definitions. With the exception of 100% solids epoxy surfacers, specifically designed for special chemical flooring, the products we sell for Industrial Maintenance are the same as the products we would sell for the new definition Floor Coatings. We have no accurate way of distinguishing sales in these coatings categories as we do not know if they are being applied to vertical surfaces, horizontal surfaces or both. The survey data from Ameron includes all coatings in the Industrial Maintenance category and not in Floor Coatings. We expect this is true for other respondents in the IM category. Changing these definitions makes the survey data invalid.

The VOC limit for Floor Coatings should be at least as high as the proposed limit for IM Coatings of 250 gm/l or the definitions for Industrial Maintenance Coatings and Floor Coatings should be changed back to the original version.

14-2 Another issue in proposing a 100 g/l limit has previously been raised in our comments on the NTS Study Results for Industrial Maintenance, Section A, Part 2. If this change in definition occurs, these comments are also applicable to floor coatings. Specifically, the issue is the VOC of very high and 100% solids products when tested under Method 24. These products use low molecular weight diluents and resins that are volatile at the Method 24 test temperature of 110°C but not at ambient conditions. As stated in our comments identified above, the two 100% solids epoxies in the NTS Studies do not have 0 VOC under Method 24 and in fact, one product, 1MC13, does not meet the 100 g/l limit proposed. Naval Sea Systems Command (NAVSEA) has also recognized this issue in trying to implement the use of 100% solid products. They are now specifying that the VOC, when tested to Method 24, should be below 150 g/l as the data they have shows this to be a reasonable limit for these products.

14-3 We also do not believe the coatings identified in the Literature Search and cited in the References of Appendix D of the proposed Architectural Coatings SCM are well suited for use in severe service environments. For example, they would not be suitable for rigorous and repeated cleaning with steam as required for floors in food processing industries nor would they have sufficient chemical and corrosion resistance required for long term use in pulp and paper facilities or the chemical process industries. Some case histories of severe service Floor Coatings are attached.

14-4 Another issue relates to citing a raw material supplier as a source for floor coatings. Air Product's "Adura" is an interesting new technology; however, this data comes from a raw materials supplier not a coatings manufacturer. As indicated at the March 16th meeting, information, or so called starting formulas from raw material suppliers, often produce less-than-promised results. Our evaluations indicate that the useful pot-life of this coating is not easily determined; i.e., coatings based on Adura have high gloss over the first two hours of pot-life but begin to loose gloss at some undetermined point thereafter. The end result might be a floor with certain areas having high gloss while other areas might be semigloss or flat.

14-5 2. Economic Impacts Survey - Considerable time was spent developing our response to ARB's Economic Impacts Survey on the proposed Architectural Coatings SCM. The survey was submitted in writing on February 25. The projected costs for compliance were based on an analysis of our High Heat, Metallic Pigmented and Industrial Maintenance product lines as we understood them to be defined in the draft SCM of 12-1-99.

14-5 We received the February 11, 2000 draft SCM on February 25th. This version excluded Floor Coatings from the Industrial Maintenance category. As previously stated, we have no accurate way of distinguishing sales in these coatings categories. We are very disappointed because the data submitted in the Economic Impacts Survey would be invalid if these definitions are changed and we have no data that would allow us to access the impact of these definition changes on our survey response.

14-6 3. Nuclear Coatings - We do not dispute the sales weighted average VOC level of 50 gm/liter, but as already discussed verbally with staff, this category contains many different types of coatings. By far, the largest surface areas in Level 1 and Level 2 containment areas are concrete and these are generally coated with 100% solids products (VOC - 0 by formula calculation method). The steel substrate areas are much smaller and these use higher VOC products. Further, we do not dispute the availability and/or technical feasibility of compliant coating but rather that it is economically unfeasible. This is because of the expensive testing requirements. It cannot be assumed that a product approved in one plant can be used in another. For example, the Design Basis Accident or DBA test simulates a major accident in Level 1 containment areas. The temperature and pressure buildup changes with reactor type and so DBA tests procedures for one site are not appropriate for another site. Further, in repairing an existing coating system with another system requires further testing than just the new system by itself. It is also tested with the existing system. So, if new products are used for the first time in a facility, then testing is usually required. Also, testing has to be done on the substrate the coating system is to be applied to so a system approved on concrete has to be tested on steel if it is to be used in this application. As can be seen, just because there are products available in this category at low VOCs, it does not mean they can be used without further expensive testing. We still believe that because such small quantities are used in California that a Nuclear Category should be added as in the National Rule.

Please feel free to call me at 714/529-1951, Ext. 389 if you have any questions regarding these comments.

Very truly yours,

Norm Mowrer

Norman R. Mowrer
Technical Manager

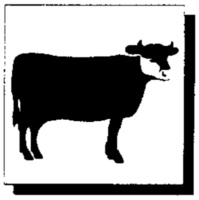
copy: Christine Stanley

Ameron®

Food & Beverage Case Histories

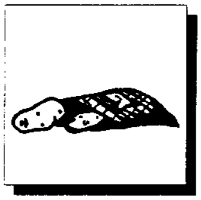
Coffee Packaging

Project	Tote room and seventh floor driers
Owner	Maxwell House
Location	Houston, Texas
Application Date	July 1986
Inspection Date	
Type of Process	Coffee
Area	Drying and packaging
Item/Use	Ceiling concrete/steel
Service	Indoors
Coating/System	Amerlock® 400/Amershield™
Substrate	Concrete/carbon steel
Surface Preparation	Abrasive blast
Application Method	Conventional spray



Meat Processing

Project	9,000 ft^2 area
Owner	Hy Plains Beef, Inc.
Location	Dodge City, Kansas
Application Date	1990
Inspection Date	
Type of Process	Meat process
Area	Dressing room
Item/Use	Interior walls
Service	Hose down daily
Coating/System	Amershield
Substrate	Previously coated concrete
Surface Preparation	Clean/roughened
Application Method	Roll



Potato Processing

Project	Potato plant
Owner	Lamb-Westin
Location	Western Region
Application Date	August 1986
Inspection Date	
Type of Process	Potatoes
Area	Storage remodeled to production
Item/Use	Deck
Service	Indoors
Coating/System	Amerlock 400
Substrate	Carbon steel/galvanized
Surface Preparation	Abrasive blast
Application Method	Airless/conventional spray

Project	Twin City Foods
Owner	Twin City Foods
Location	Prosser, Washington
Application Date	May 1982
Inspection Date	October, 1982
Type of Process	Potatoes
Area	Waste storage
Item/Use	Tank exterior/interior
Service	Atmospheric/immersion potato waste
Coating/System	Amerlock 400
Substrate	Carbon steel
Surface Preparation	Power tool cleaned
Application Method	

Wineries

Project	Gallo Winery
Owner	Gallo
Location	Livingston, Fresno & Modesto, California
Application Date	1985 and ongoing (May 1988)
Inspection Date	
Type of Process	Wine making
Area	Bottling room
Item/Use	Pipe/tank exteriors (Concrete walls)
Service	Atmospheric/(Interior)
Coating/System	Amerlock 400/(400/Amershield)
Substrate	Steel/(Concrete)
Surface Preparation	Wire brush clean/(Remove loose paint)
Application Method	Airless spray

Project	Gallo Winery
Owner	Gallo
Location	Modesto, California
Application Date	June 1988
Inspection Date	
Type of Process	Wine making
Area	Recycling
Item/Use	Sump
Service	Abrasion
Coating/System	Nu-Klad® 105/Nu-Klad 100A
Substrate	Concrete
Surface Preparation	Acid etch
Application Method	Spray

Project	Winery
Owner	Acacia
Location	Napa Valley, California
Application Date	February 1989
Inspection Date	
Type of Process	Wine making
Area	Exterior
Item/Use	Structural steel/wood
Service	Atmospheric
Coating/System	Amercoat 220
Substrate	Stainless steel/wood
Surface Preparation	
Application Method	Airless spray
Environment	40 mph winds, 20°F with wind chill factor

Tomato Processing

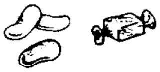
Project	Hunt Wesson
Owner	Beatrice Foods
Location	Oakdale, California
Application Date	1988
Inspection Date	
Type of Process	Tomato sauce
Area	Near sumps
Item/Use	Exterior conveyors
Service	Atmospheric
Coating/System	Amerlock 400
Substrate	Steel
Surface Preparation	Power tool/wire brush cleaned
Application Method	Conventional spray

Project	Hunt Wesson
Owner	Beatrice Foods
Location	Oakdale, California
Application Date	1985
Inspection Date	
Type of Process	Tomato sauce
Area	Plant interior
Item/Use	Interior walls/structural steel
Service	Indoors
Coating/System	Amercoat 395 (two coats)
Substrate	Masonry/steel/carbon steel
Surface Preparation	Brush-off blast
Application Method	Conventional spray

Salt/Sugar Processing

Project	Processing plant
Owner	Lesley
Location	Newark, California
Application Date	1982
Inspection Date	
Type of Process	Salt
Area	Drying room
Item/Use	Floors
Service	Abrasion
Coating/System	Nu-Klad 105/Nu-Klad 100
Substrate	Concrete
Surface Preparation	
Application Method	Spray

Project	Processing plant
Owner	Spreckels
Location	Arizona/(Crockett, California)
Application Date	1980/(June 1990)
Inspection Date	1986
Type of Process	Sugar
Area	Manufacturing
Item/Use	Floors
Service	Abrasion
Coating/System	Nu-Klad 105/Nu-Klad 100 (Nu-Klad 120/Amershield)
Substrate	Concrete
Surface Preparation	
Application Method	Spray/(roll)



Candy Factories

Project	Candy factory
Owner	Jelly Belly
Location	Fairfield, California
Application Date	August 1988
Inspection Date	
Type of Process	Jelly beans
Area	Manufacturing
Item/Use	Test wall
Service	Indoors
Coating/System	Amercoat 335
Substrate	Textured sheet rock coated with flat latex
Surface Preparation	Detergent wash
Application Method	Conventional spray

Project	See's Candy - Mansard roof
Owner	See's Candy, Inc.
Location	Honolulu, Hawaii
Application Date	Novembe, 1986
Inspection Date	
Type of Process	Chocolate manufacturing
Area	Exterior
Item/Use	Roof
Service	Atmospheric
Coating/System	Amerlock 400/Amershield
Substrate	Porous
Surface Preparation	Water wash
Application Method	Roll

Project	Candy factory
Owner	Skonza
Location	Oakland, California
Application Date	May 1988
Inspection Date	
Type of Process	Hard candy
Area	Processing areas
Item/Use	Walls/steel pipes
Service	Indoors
Coating/System	Amercoat 335 over existing Waterborne 1-pack epoxy deck paint
Substrate	Steel/masonry/drywall/wood
Surface Preparation	Detergent wash
Application Method	Airless spray/brush/roll

Mushroom Canning

Project	World's largest mushroom processor
Owner	Golden Gourmet Mushroom
Location	San Diego, California
Application Date	July 1990
Inspection Date	
Type of Process	Mushroom farm and canning facility
Area	Processing area
Item/Use	Walls/floors/ceilings
Service	Interior/moisture
Coating/System	Amerlock 400/Amershield
Substrate	Concrete
Surface Preparation	Detergent wash/abrasive blast (floor)
Application Method	Spray/roll

Processing Facility

Project	Processing facility
Owner	General Mills
Location	Chicago, Illinois
Application Date	July 1988
Inspection Date	
Type of Process	Cereals/food stuffs
Area	Processing areas
Item/Use	Structural steel
Service	Indoors
Coating/System	Amerlock 400
Substrate	Steel
Surface Preparation	Detergent wash/mechanical cleaning
Application Method	Spray

Ameron®
Protective Coatings
Group

201 North Berry Street, Brea, California 92622-1020 • J. F. Kennedylaan 7, 4191 MZ Geldermalsen, The Netherlands

Ameron

Case History

No. 1012

Description
Cafeteria floor

Location
Large midwest university

System
Amerlock 400 and subsequently polished to provide decorative glossy finish and enhance cleanability

Surface Preparation
Detergent/fresh water wash of existing alkyd paint

Date of Application
March 1989

Reference
Ameron's Midwest Office
(708) 377-3070

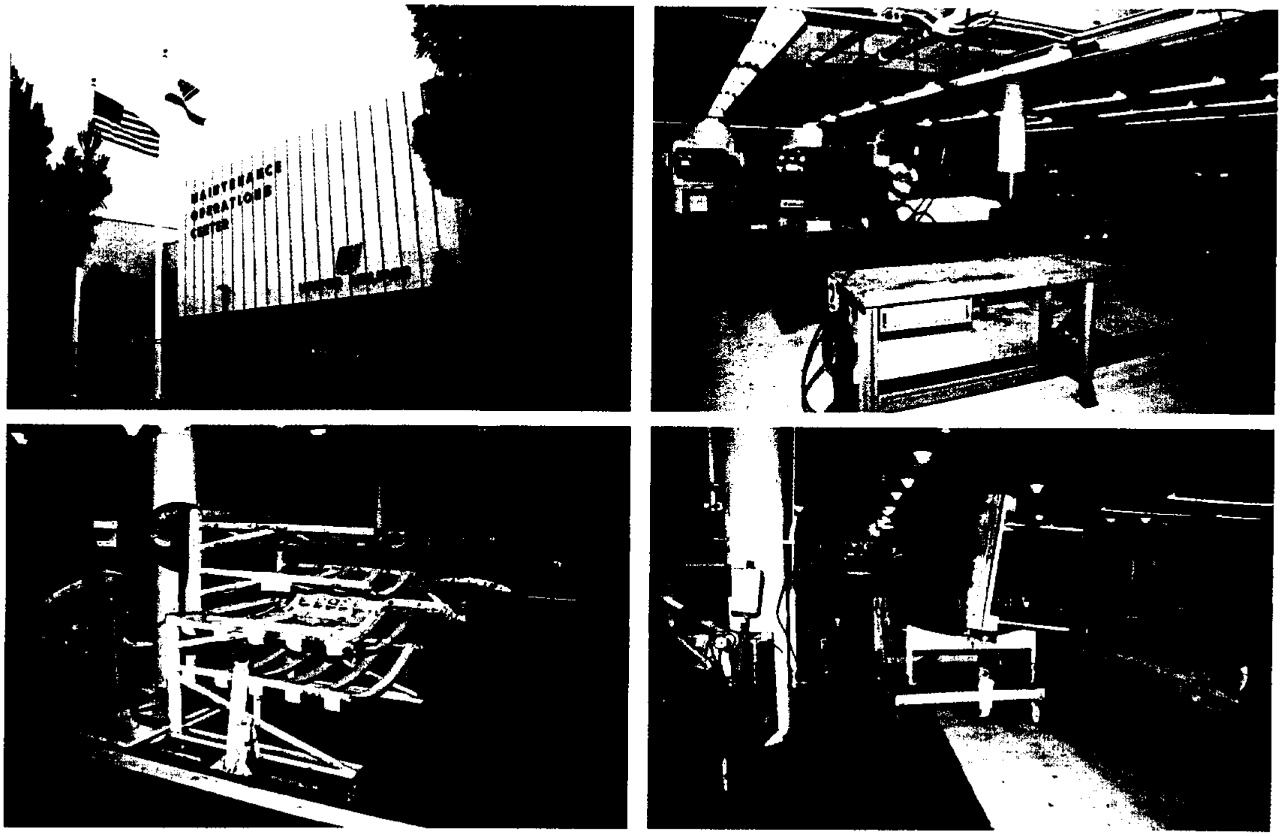
Date of this Report
August 16, 1991

Protective Coatings Division
201 North Berry Street
P.O. Box 2236
Brea, California 92622
(714) 529-1951

Ameron

Case History

No. 1036



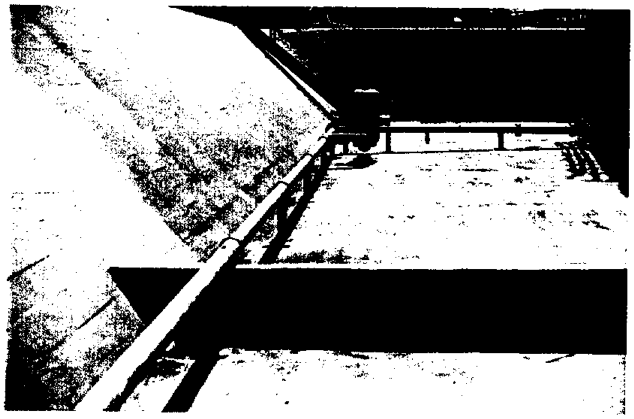
Description	Concrete flooring protection in maintenance shop
Location	United Airline Maintenance Operations Center, San Francisco, California
System	LockShield
Surface Preparation	Rotor blasted on Friday and in service on Monday
Date of Application	September 1989
Reference	Ameron's Concord Office (510) 825-7771
Date of this Report	November 22, 1991

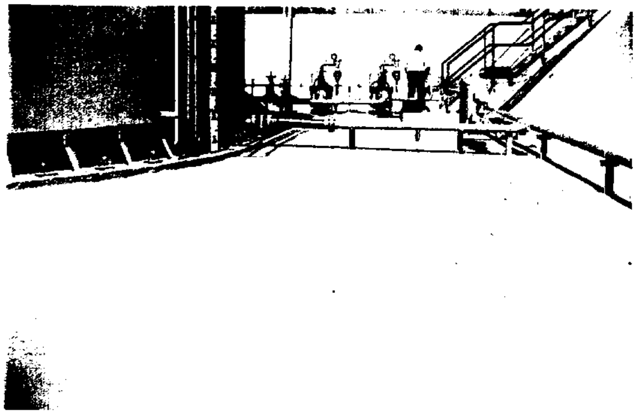
Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

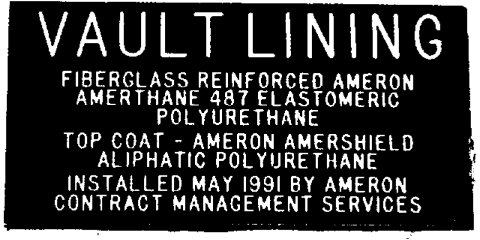
Ameron

Case History

No. 1037





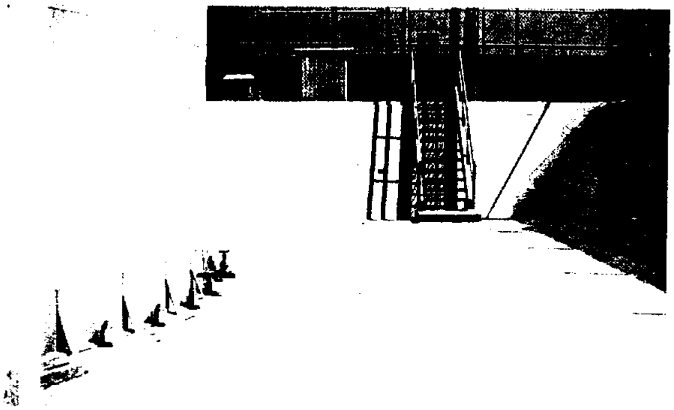


VAULT LINING

FIBERGLASS REINFORCED AMERON
AMERTHANE 487 ELASTOMERIC
POLYURETHANE

TOP COAT - AMERON AMERSHIELD
ALIPHATIC POLYURETHANE

INSTALLED MAY 1991 BY AMERON
CONTRACT MANAGEMENT SERVICES



Description	Vault Lining
Location	IBM Facility, San Jose, California
System	Amerlock 400 primed concrete blocks, fiberglass reinforced Amerthane 487/Amershield
Surface Preparation	Concrete block under layment over existing secondary containment system
Date of Application	May 1991
Reference	Ameron's Western Regional Office (714) 529-1951
Date of this Report	November 22, 1991

Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

Ameron

Case History

No. 1019

Description	Lexus Service Center & Delivery Area
Location	Honolulu, Hawaii
System	LockShield system with sand added to Amershield for non-slip purposes
Surface Preparation	Roto blast
Date of Application	Spring 1989
Reference	Ameron's Honolulu Office (808) 946-6690
Date of this Report	August 19, 1991

Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

Ameron

Case History

No. 1011

Description
Concrete floors, piping, valves, air ducts, railings and other interior metal structures

Location
Grand Gulf Nuclear Power Station, Port Gibson, Mississippi

System
Floors - Nu-Klad 110AA/ LockShield system.
Railings, piping, beams, etc. - LockShield system

Surface Preparation
High pressure water wash and spot power tool clean

Date of Application
June 1986

Reference
Ameron's New Orleans Office
(504) 733-9500

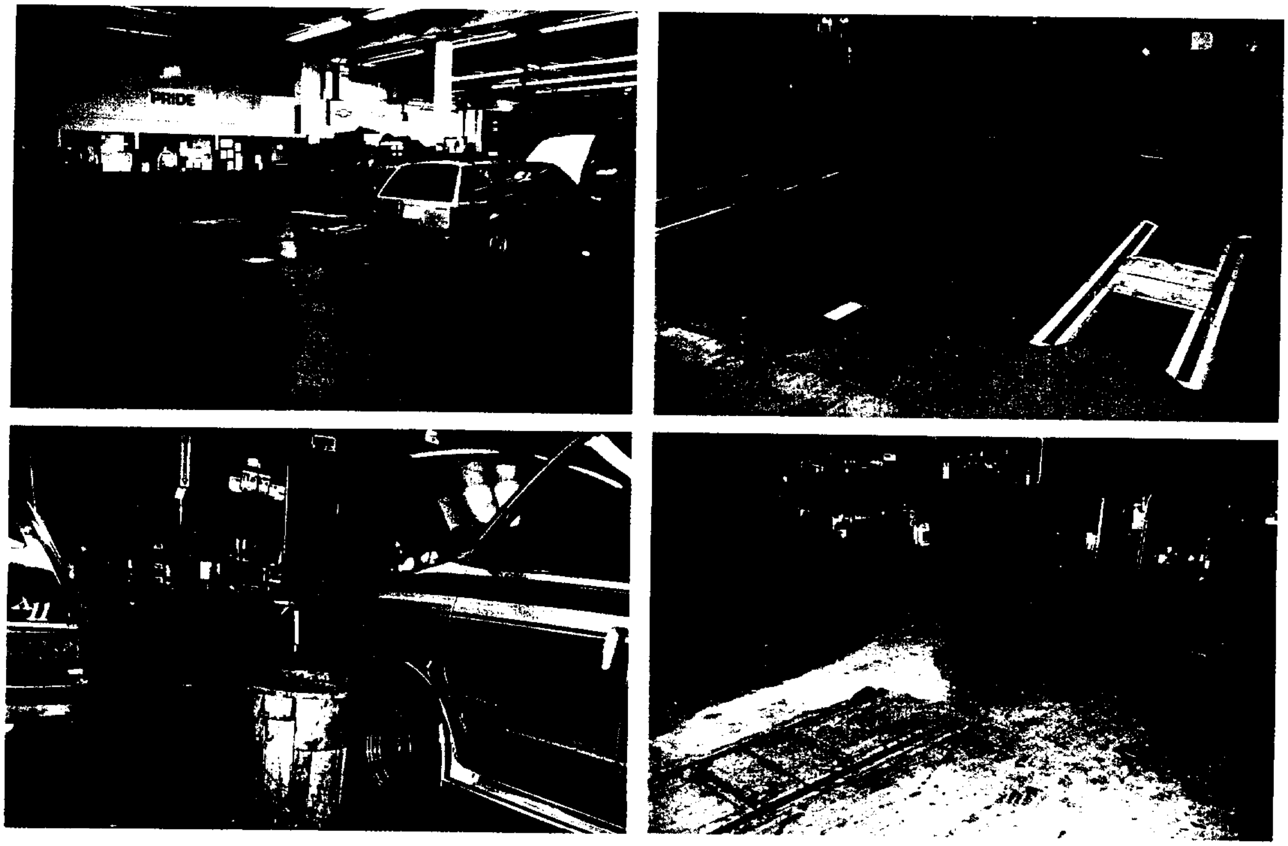
Date of this Report
August 16, 1991

Protective Coatings Division
201 North Berry Street
P.O. Box 2236
Brea, California 92622
(714) 529-1951

Ameron

Case History

No. 1029



Description	Auto dealership service areas, before and one year after application
Location	Major auto dealership in Albuquerque, New Mexico
System	LockShield system
Surface Preparation	Several applications of biodegradable detergent with steam to remove oil and grease, followed by blasting to clean substrate
Date of Application	Spring 1990
Reference	Ameron's Western Regional Office (800) 9-AMERON
Date of this Report	August 22, 1991

Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

CBIZ

Century Business Services

Kessler & Associates Business Services, Inc.
510 11th Street, S.E.
Washington, D.C. 20003
Phone: (202) 547-6808
Fax: (202) 54[illegible]

VIA FACSIMILE

April 7, 2000

Mr. Jim Nyarady
Manger, Strategy Evaluation Section
Stationary Source Division
California Air Resources Board
2020 L Street
PO Box 2815
Sacramento, California 95812

Re: Draft Program Environmental Impact Report for CARB's Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

Kessler & Associates, Inc., a government affairs firm, represents Dunn-Edwards Corporation ("Dunn-Edwards"), a Los Angeles, California-based manufacturer and seller of quality architectural coatings. Dunn-Edwards submits the following comments regarding the Draft Program Environmental Impact Report ("Draft EIR") for the proposed Suggested Control Measure ("SCM") for Architectural Coatings.

The SCM is an unenforceable guideline which individual Air Quality Management and Air Quality Control Districts may choose to adopt and enforce in the future. (EIR at I-3). The SCM bans architectural coatings with volatile organic compound ("VOC") content higher than the limits set in the SCM.

15-1 Before CARB may validly approve the SCM it must comply with the California Environmental Quality Act ("CEQA"). Cal. Pub. Res. Code § 21000 et seq. CEQA requires, among other things, identification of all potentially significant adverse environmental impacts resulting from CARB's proposed action, Cal. Code Regs. tit. 14 §§ 15126, 15126.2, and steps to mitigate any such adverse impacts. Cal. Pub. Res. Code § 21002.

The Draft Program EIR does not fulfill these CEQA requirements. The Draft EIR contains material factual errors, including improper analysis of statistical and technical data, and misinterpretation of accepted science, as well as questionable policy decisions. As a result of these errors and decisions, the Draft EIR incorrectly concludes that the

SCM will have no adverse environmental impacts. The gravity of this mistake is made more severe by the Draft EIR's decision not to consider the effects of the SCM on a region-by-region basis, as is essential due to the varying effect of VOC reductions on ozone levels in different areas of California.

15-1 In fact, the proposed SCM has the potential to cause significant adverse environmental impacts in various regions of California, while providing virtually no environmental benefit anywhere. The Draft EIR has ignored these adverse consequences and misinformed the public about the true impact of the SCM.

15-2 Most importantly, the Draft EIR does not properly evaluate the science of ozone production and destruction. Sound policy dictates that *before* acting, regulators should fully understand the objectives of their actions and the mechanisms they plan to implement to achieve those objectives. In the case of VOC regulation to reduce ozone, this necessary understanding is lacking. In correcting the deficiencies in the Draft EIR, the ARB should follow the findings and recommendations of leading scientists and re-evaluate it's emphasis on statewide VOC controls as the primary tool for reducing ozone. CARB should reconsider its approach in light of the conclusions of the National Academy of Sciences that NOx control, *instead* of VOC control, may be the optimal ozone-reduction strategy in some areas.[1] In addition, the Draft EIR should better explain the effect on ozone levels of VOC emission reductions in the presence of varying NOx levels. This should include a detailed examination of NOx transport across California. VOC regulations alone cannot attain the NAAQS, and can be counterproductive if not optimally implemented. Instead, NOx reductions and the control of NOx transportation are crucial.

Because of the complexity of ozone production, varying according to atmospheric conditions, climate, and other factors, VOC control may be ineffective in reducing ozone and, in fact, can *increase ozone levels* in some circumstances.[2] The Draft EIR should comprehensively determine *where* VOC controls will be effective and where they will not, including mapping areas with conditions conducive to negative reactivity. This has not been done. Instead, the Draft EIR assumes that VOC emission reductions are the optimal regulatory strategy in all regions of California. This assumption precludes CARB from understanding the true effects of the SCM, including whether or not the SCM will have an adverse environmental impact. For these reasons, the Draft EIR does not comply with CEQA.

15-3 Dunn-Edwards hopes that its comments will help clear up some of the misinformation in the Draft EIR and provide a sound basis for a revised SCM that achieves the

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[1] National Academy of Sciences, "Rethinking the Ozone Problem in Urban and Regional Air Pollution," (hereinafter "Rethinking Ozone") at 11 (1991).

[2] *See, e.g.*, Rethinking Ozone, at 154-55 (chart showing negative reactivities); A. Russell, et al., "Urban Ozone Control and Atmospheric Reactivity of Organic Gases", Science, July 28, 1995, at 491; William P.L. Carter & Roger Atkinson, "Computer Modeling Study of Incremental Hydrocarbon Reactivity", 23 Envtl. Sci. & Tech. 864 (1989) (chart showing negative reactivities).

complementary goals of improving the environment while at the same time preserving California manufacturers' ability to produce high quality architectural coatings.

CHAPTER I – LEGAL AUTHORITY AND EXECUTIVE SUMMARY

A Program EIR Is Not Properly Tailored to the SCM

An EIR's primary purpose is to inform the ARB, other governmental agencies and the public generally of the environmental impacts of a proposed project. Cal. Code Regs. tit. 14 §15003(c). The lead agency must consider the whole of an action, not simply its constituent parts when determining whether it will have a significant environmental effect. *Id.* §15003(h). 15-4

The California Code of Regulations provides for the use of several types of EIRs, each of which is tailored to different kinds of agency actions. CARB elected to use one such type of specialized EIR for its SCM – the "Program EIR." A Program EIR is not the appropriate CEQA document for the SCM because it does not present the ARB with technical information necessary to evaluate the potential adverse environmental impacts associated with implementation of the SCM.

The California Code of Regulations sets out in detail the situations in which a Program EIR may be used and the factors to be considered in determining whether to use it. Specifically, a Program EIR may be used where an agency proposes to engage in actions related in certain ways, *id.* § 15168(a) (*i.e.*, geographically, as part of a chain of actions, in connection with the issuance of rules to govern the conduct of a continuing program, or as individual activities having similar environmental effects), and where a Program EIR allows the agency to obtain certain "advantages," *id.* § 15168(b), most importantly, that the Program EIR allow "for a more exhaustive consideration of effects and alternatives than would be practical in a[ ] [Project] EIR." Here, instead of allowing for a more *exhaustive* consideration of the effects of the SCM, the Draft Program EIR analyzes the environmental impacts of the SCM under the assumption that effects on ozone levels will be *qualitatively identical* across airsheds. Its analysis proceeds at a level of generality that *allows it to gloss over the negative environmental impacts of the SCM.* By considering the effects of the SCM on a state-wide basis, the Draft EIR is able to reach the tidy conclusion that if overall VOC emissions will be lowered, ozone levels will fall. These assumptions are incorrect – the SCM will have different, and sometimes *negative* effects on ozone levels in different areas of California.

15-5 The technical analysis of the impacts contained in the Draft EIR is vague and does not address the unique conditions of each of California's 35 air Districts. Perhaps the Draft EIR assumes that each District will prepare its own CEQA analysis if it chooses to adopt the SCM. This assumption fails for two reasons. First, to our knowledge only a few of the 35 districts have ever completed CEQA documentation for rulemaking. Most districts do not have the staff resources or CEQA experience to prepare additional documentation on individual architectural coatings rules.

Second, the Draft EIR does not present adequate information to inform CARB or the general public of the potential adverse environmental consequences associated with this

15-6 SCM. Use of the Program EIR cannot "excuse the lead agency from adequately analyzing reasonably foreseeable significant environmental effects of the project and does not justify deferring such analysis to a later tier EIR or Negative Declaration." *Id.* § 15152(b). The Draft EIR does not include adequate analysis of the significant effects that this project may have on air quality and ozone formation throughout California, and it does not hint that there may be negative or even qualitatively different effects on ozone levels in certain regions of the state. These deficiencies render the SCM flawed and the Draft EIR non-compliant with CEQA's express requirements and over-arching purpose.

CHAPTER II – PROJECT DESCRIPTION

Emission Inventory Issues

15-7 Accurate inventories of VOC and NOx emissions are essential to understanding the ozone problem and the effects of a rule like the SCM. By incorrectly assuming that VOC emissions from architectural coatings make up four percent of the overall VOC emissions inventory, (EIR at II-20), the Draft EIR overestimates the necessity for and potential environmental benefits of the SCM. The negligible potential environmental benefits make more important the potential *adverse* environmental effects of the SCM and should cause CARB to re-evaluate the conclusions of the Draft EIR and reconsider the advisability of the SCM.

The SCM and Draft EIR Incorrectly Assume that VOC Content is Equivalent to VOC Emissions

15-8 The Draft EIR states that "the proposed project is essentially a model rule intended to reduce volatile organic compound *emissions* from architectural coatings." (EIR at II-17) (emphasis added). Contrary to the Draft EIR's characterization, this SCM does not regulate VOC emissions, but rather regulates the VOC *content* of architectural coatings.[3] The remainder of Chapter 2 of the Draft EIR and the SCM itself are based on the incorrect assumption that reductions in VOC content necessarily translate into reductions in VOC emissions. Therefore, any expected benefits of the SCM and any projections and conclusions regarding the effect (positive or negative) of the SCM on ozone levels should be re-examined.

15-9

The Draft EIR Incorrectly Concludes that there is no Discrepancy Between its VOC Emission Inventory Estimates and Actual VOC Ambient Monitoring

The Draft EIR attempts to explain away the discrepancy between emission inventory estimates and ambient monitoring data with respect to architectural coatings emissions.

15-8 [3] CARB addresses this assumption in its response to Dunn-Edwards' July 12, 1999 comment on CARB's Initial Study, claiming that it is supported by the use of "Method 24" which purports to measure VOC emissions from architectural coatings. (EIR Appendix C-4). Dunn-Edwards believes that Method 24 does not accurately measure VOC emissions from coatings under real-world evaporative conditions because Method 24 measures VOCs emitted from coatings when the coatings are heated above the boiling point of water.

15-9 The analysis offered, however, is erroneous and otherwise misleading. Contrary to the Draft EIR's implication, the important "source apportionment study," (Fujita, et al.), cited in the Draft EIR does not report that architectural coatings are a major contributor to ambient VOCs in the South Coast Air Basin. Instead, the study concludes that surface coatings *in aggregate* are major contributors. In the study, 93 percent of emissions from surface coatings are attributed to *non-architectural*, "industrial [OEM] coatings," *i.e.*, coatings applied to manufactured articles at a factory or shop. The Draft EIR also misquotes data from the study, saying that this source "specifies that architectural coatings contributed an average of 3.2 to 5.0 percent (at three ARB sites) . . . to the NMHC in Los Angeles." (EIR at II-20). Actually, the range of emissions from architectural coatings at those sites is 0.2 to 0.8 percent, with an average of 0.3 percent. (*See* Fujita, et al. at Table 5-1). The percentages given in the Draft EIR were apparently inadvertently taken form a line of data on industrial [OEM] coatings. The Draft EIR later says that industrial coatings "contributed 1.7 to 9.3 percent (ARB sites)," while "other coatings contributed 1.7 to 10 percent . . . ." (EIR at II-20). This is apparently a double misreading of a single line of data given for unidentified hydrocarbons that could not be attributed to any known sources (but are believed to be "secondary organic species produced by photochemical reactions" involving emissions from all sources).

After pointing out that the architectural coatings speciation profile used in the study was derived solely from solventborne coatings, *id.*, the Draft EIR "concludes that because waterborne coatings make up roughly 80 percent of the inventory [for architectural coatings], and assuming the solventborne coatings make up an average of one percent of the inventory in the source apportionment study, the real percentage of the architectural coatings inventory in the source apportionment can be estimated to be four percent. This is the same number as the ARB reports in its emission inventory." (*Id.*) The actual average percentage attributed to architectural coatings (across all monitoring sites and times) in the source apportionment study, however, is not one percent but rather 0.25 percent. (*See* Fujita, et al. at Tables V-1, V-2, V-3, and V-4). And the Draft EIR later admits that "82 percent of [architectural] coatings used in California are waterborne, yet waterborne coatings account for only 33 percent of the total emissions [from architectural coatings]. (EIR at IV-74). Conversely, while only 18 percent of total sales are solventborne coatings, they account for 67 percent of the emissions." Re-doing the calculation with the correct numbers, therefore, would give 0.25 percent divided by 67 percent, which equals 0.37 percent, or less than one-tenth the number ARB assigns architectural coatings in its emission inventory. This significant discrepancy raises questions as to whether architectural coatings make any significant contribution to air pollution, and whether any further regulation of architectural coatings is warranted -- much less the drastic reductions of the proposed SCM.

15-10

The Draft EIR Mischaracterizes the Likely Reductions in VOC Emissions Absent the SCM

CARB's justification for the SCM is the supposed need to reduce VOC emissions from architectural coatings -- reductions estimated to be 11.3 tons per day if adopted state-wide. (EIR Table II-3). The Draft EIR's own statistics, however, demonstrate that regulation is not necessary to achieve this goal. *Id.*

First, the Draft EIR incorrectly asserts that "[f]or the most part, California districts will not see additional emission reductions from the national rule, since the majority of the national limits are equal to or higher than the districts' limits." (EIR at II-18). Currently, only approximately one-half of California's 35 air districts have adopted limits more stringent than EPA's national architectural coating rule. All other districts must comply with the national rule and so will achieve the attendant VOC emissions reductions.

15-10

Second, the Draft EIR indicates that from 1990 through 1996 -- a period in which no significant new architectural coatings rules or amendments to pre-existing rules were put into effect in California -- VOC emissions from architectural coatings fell from 126 tons per day to 117 tons per day. (EIR Table II-1). This translates into a reduction of seven percent for that time period or 1.2 percent per year. Assuming the same rate of reduction (absent any further regulation), for the seven year period from 1996 to 2003 (the date of implementation for the SCM),[4] VOC emissions from architectural coatings would fall a further 8.4 tons -- *almost the entire amount targeted by the SCM.* This directly contradicts the Draft EIR's assumption that "without additional architectural coatings regulations, the inventory for architectural coatings emissions will increase due to population growth." (*Id.* at III-36). The internal inconsistency of the Draft EIR on such a crucial point demonstrates the need for further consideration of the SCM and its projected environmental impacts.

The VOC Limits in the SCM Are Not Technologically Feasible

15-11 In an effort to demonstrate that the SCM's VOC limits (set out in Table II-3) are technologically feasible, the Draft EIR relies heavily on the ARB survey of 1996 architectural coatings and the NTS study of architectural coatings performance (commissioned by the South Coast Air Quality Management District ("SCAQMD")). (EIR at II-23 to II-27). In particular, the Draft EIR's conclusion that the SCM VOC content limits are feasible is based primarily on the fact that there are some currently-available coatings within each coating category that comply with the proposed limits; therefore, these low VOC coatings can adequately perform the full range of applications required of coatings within their coating category. The Draft EIR's logic is flawed and the survey and study (whether considered separately or in conjunction) do not provide adequate basis for rule development, nor any justification specifically for the proposed SCM.

15-12 With respect to data on the various coating categories, the 1996 survey is flawed because many coatings were miscategorized by respondents, for a number of reasons. In some cases, manufacturers were simply unfamiliar with the definition and rationale for a given category. For example, a large volume of waterborne primers, sealers and undercoaters was miscategorized as "Quick-Dry Primers, Sealers & Undercoaters" based on the dry-time included in the definition of that category.[5] In other cases, confusion was generated

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15-10 [4] This emission reduction trend can be expected to continue, even in the absence of further regulation, since it is consistent with the long-term, market-driven trend toward lower cost coatings, which are often low-VOC coatings.

15-12 [5] Waterborne coatings will generally meet the dry-time requirement under favorable (warm and dry) conditions, although such products are not marketed as "quick-dry"

15-12 by including in the survey form approximately 20 categories defined in U.S. EPA's new national rule for architectural coatings, but not found in any of the current local district rules in California. Some manufacturers classified products into the national rule categories, while others reported similar products only in the categories under which those products are marketed in California.

Even had all products been correctly categorized, however, the survey still fails to provide reliable guidance on appropriate VOC content limits, because the survey collected no performance data on the coatings subsumed under each category. The arbitrary breadth of the major coating categories results in aggregation of many coatings that differ widely in composition, specific intended use, performance characteristics, and VOC content. As the basis for its conclusion that the SCM's VOC limits are feasible the Draft EIR appears to assume that all coatings within a category are interchangeable. In fact, the various products within a category are not interchangeable. In general, coatings at the lower end of the VOC content range are not adequate substitutes for all coatings at the higher end. Specific examples of technologically infeasible limits included in the SCM include:

15-13

- *Non-flat Coatings* (150 g/L VOC): Coatings exist at or below this level; however, the coatings with best durability and resistance to deterioration by water, corrosion, physical contact, loss of adhesion, erosion, film cracking, discoloration, household chemical attack and the effects of infrared and ultraviolet radiation of sunlight require "hard " resins which must be formulated at >200 g/L to achieve maximum performance. Resins cited in the NTS study for Rohm & Haas, BASF, Vianova designed to form films at low VOC levels at best show good block resistance.

  The discussion of non-flat coatings in Appendix D is misleading. The NTS study states that flow and leveling characteristics are superior for existing alkyd paints (>350 g/L VOC) compared with any water base products (150-250 g/L VOC). Furthermore, the <150g/L coatings discussed on page 15 of Appendix D are not at the highest performance levels achievable. The qualities cited on pages 16-17 of Appendix D are marketing terms-of-art used by manufacturers to de-emphasize the compromises made necessary by excessively stringent VOC content limits -- hardly a guarantee of the ultimate of performance.

15-14

- *Primer, Sealers and Undercoaters* (200 g/L VOC): Coatings exist at or below this level; however, the surface to be prepared and coated and/or top-coated, and the exposure conditions must be considered. Alkyd based systems at >350 g/L are more forgiving if the surface is less than perfectly prepared, *e.g.*, wood prone to bleed thru, rusty metal, and chalky surfaces. Products <200 g/L VOC are satisfactory, in most cases, only when a very clean, uncompromised surface is available. This is seldom the case in most architectural repaint situations. Some substrates (metals, plastics, man-made materials) are so difficult to properly adhere to that special latex resins need the use of >200 g/L VOC coatings.

15-12 coatings because they cannot meet the dry-time requirement under adverse (cool and wet) conditions.

15-14 General alkyd based wood primers need at least 380 g/L to effectively protect natural wood surfaces. Alkyd and other solvent borne primers, sealers and undercoaters for man-made synthetic woods and other composite building materials may need >400 g/L coatings because of their unique surface chemistries and physical profiles which are difficult to adhere to.

15-15

- *Industrial Maintenance Coatings* (250 g/L VOC). Coatings exist at or below this level; however, this category is too broad to have a single VOC standard for all of the types of resin systems, surfaces and conditions where industrial maintenance coatings are used. Each surface requires a specific coating to achieve the cost of coverage per year of service desired. For example, two component epoxy systems are available at <250 g/L VOC are totally adequate for tank linings or cement coatings but for ultimate resistance the ultraviolet degradation and ease of application a single component polyurethane at >250 g/L VOC is the best choice.

15-16 As discussed at pages 10-14, below, using inadequate substitutes would be environmentally counterproductive because more coating material will be applied on each job; more thinning solvents will be added to coatings; and more frequent re-coating will be necessary; therefore, more paint will be used and more VOCs emitted.

15-17 The Draft EIR's erroneous analysis is exacerbated by the fact that a large percentage of the projected emissions reductions come from the industrial maintenance and quick-dry primers, sealers, and undercoaters categories -- categories for which compliant coatings comprise only 28% and 34.6% of the total market respectively. Therefore, the Draft EIR's assumption that existing compliant coatings perform adequately to replace all existing higher-VOC coatings is particularly doubtful for these categories.

15-18 The Draft EIR also relies on the NTS study, which may yet provide relevant performance data on coatings in certain categories -- when all three phases of the study are complete: laboratory testing; field-application studies; and long-term exposure studies. To date, only the first-phase, laboratory testing, is finished, although the preliminary data is still undergoing QA/QC review. The Draft EIR, however, mischaracterizes the preliminary results of the study, saying they "show that when compared to conventional, currently compliant coatings, low-VOC coatings available today have similar application and performance characteristics, including blocking resistance, mar resistance, adhesion, abrasion resistance, and corrosion protection." (EIR at II-26). In fact, the results show that while a given low-VOC alternative may have similar blocking resistance, and another might have similar adhesion or abrasion resistance, and so on, all such products are deficient in other characteristics. Simply put, the low-VOC alternatives are less adequate when examined in terms of the total constellation of performance characteristics that coating formulators seek to optimize. (See enclosed article, "Novel Approach to Formulation Modeling," European Coatings Journal, Jan/Feb 2000).

CHAPTER III – EXISTING SETTING

Impacts on Air Quality

15-19 The Draft EIR's description of ozone formation is oversimplified and misleading. Ozone formation is dependent on a number of factors and variables. Among the factors not adequately addressed in the Draft EIR is the role in ozone formation of NOx levels and the widespread NOx transport throughout California -- issues crucial to determining the environmental effects of VOC emission reductions.

Furthermore, the Draft EIR incorrectly implies that VOCs always contribute to ozone formation. To avoid this mistake, the Draft EIR should explain in greater detail the roles in ozone formation of NOx, VOCs, and other atmospheric factors. This analysis should be performed for various atmospheric conditions representing the various conditions present in California at various times of the year.

Other Potential Adverse Impacts of the SCM

15-20 ***Water supply***: Water delivery systems in California are painted with a coating that is intended to last several years. If the integrity of these coatings is reduced, repainting at significant costs will be needed. The ability to pay for this is questionable, with the degradation of the delivery systems being negatively impacted.

Discharges to POTWs/Solid Waste: Increased painting caused by the need to re-paint more frequently, as a result of decreased coating quality, will place additional strains on the municipal wastewater treatment facilities and landfills. 15-21

15-22 ***Schools***: School budgets (and child safety) will be adversely impacted. The cost of more frequent repainting may be prohibitive, causing some structures to degrade. This may place children in structures that are not as sound as they otherwise would be.

15-23 ***Public Health and Safety***: Replacing commonly used solvents through reformulation will lead to increased hazards. For example, acetone is touted as a replacement solvent, although it is a hazard to the typical homeowner (see page 16, below). Although other VOCs currently used have some degree of hazard, coatings containing the most dangerous VOCs are typically handled only by trained contractors, not homeowners. This will change under the new SCM, which will force new and unproven technology into the do-it-yourselfer market.

The Draft EIR Does Not Adequately Take Into Account Regional/Climatic Factors

15-24 The various climates of California, (*see, e.g.*, EIR at III-32 to III-41), cry out for a more sophisticated approach than the one-size-fits-all approach currently proposed. The SCM has the potential to cause different effects in each region of California. Biogenic VOCs play an important role in some areas, but not others. Negative reactivity may occur in some areas, but not others. To adequately describe the existing setting, the Draft EIR

15-24 should describe each separate airshed and how the SCM will impact each on a seasonal basis. This analysis would show that architectural coatings regulations are not necessary in many regions, and expose the falsity of the Draft EIR's assumption that the SCM will reduce ozone levels across all of California. The generalities offered by the Draft EIR in do not describe the effects of the SCM and are not consistent with CEQA's primary requirement to examine, identify, and mitigate adverse environmental impacts caused by the SCM.

The differences in climate also underscore the need for coatings able to withstand extreme climatic conditions, including heat, cold, humidity, rain, and pollution. The Draft EIR contains no discussion regarding the ability of currently-available compliant coatings to perform in these conditions -- yet another shortcoming of the Draft EIR's evaluation of the technological feasibility of the SCM's proposed limits.

CHAPTER IV – ENVIRONMENTAL IMPACTS AND MITIGATION

Air Quality

15-25 The Draft EIR nowhere estimates the SCM's actual effect on ozone levels. This is probably because the 11.3 tons per day VOC reduction contemplated by the SCM, even if achieved, will have virtually *no* effect on ozone levels. To portray the SCM as effective and substantial, the Draft EIR attempts to justify it by indicating the absolute tonnage reduction and the percentage reduction from existing architectural coatings VOC emissions levels. (*See* EIR Table II-1). Although this indicates the SCM could substantially reduce the percentage content of VOCs in architectural coatings (with extremely high attendant costs for manufacturers and consumers), the Draft EIR's analysis does not indicate what percentage of the overall VOC emission inventory will be reduced by the SCM. In fact, according to the Draft EIR's own numbers, the 11.3 tons/day decrease represents a miniscule 0.3% decrease in the overall anthropogenic VOC emission inventory.[6] Contrast the Draft EIR's approach in evaluating whether the SCM will have a substantial adverse environmental impact, whereby it repeatedly analyzes not the absolute impact on waste disposal, landfill space, water quality, or other adverse environmental impacts resulting from the SCM, but rather the percentage increase as compared with the total. (*See, e.g.* Table IV-7, Table IV-9, Table IV-11, Table IV-12). By using different metrics, the Draft EIR is able to characterize the benefits of the SCM as large and the adverse impacts as small, thereby blurring the issues and misleading readers. the Draft EIR should use an "apples to apples" comparison of environmental costs and benefits, using a consistent metric for both.

Analysis of "Industry Issues"

15-26 Pages IV-61 through IV-80 address a number of issues bringing into doubt the Draft EIR's conclusion that VOC content limits will result in an overall decrease in emission from architectural coatings. Over the past, industry has many times raised these issues, commonly referred to as the "Seven Deadly Sins." These issues suggest that stringent

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15-25 [6] The overall VOC inventory is reported to be 3200 tons per day. (EIR at II-19).

regulations like the SCM will lead to substitution of less adequate coatings that require more coats, more priming, more frequent recoating, more touch-ups, and more thinning, to cover the same area for the same period of time as a higher-VOC coating; therefore, more paint is needed to do the same job and more VOCs are emitted They also suggest that because the VOCs commonly found in low-VOC coatings often have higher reactivities than the most prevalent VOCs in higher-VOC coatings, regulations limiting the mass content of VOCs may actually result in increased ozone. 15-26

the Draft EIR's response to these issues is inadequate. First, the Draft EIR repeatedly misstates industry's position in important ways. Second, the Draft EIR can point to no study supporting its positions. Instead, the Draft EIR's arguments rest on (EIR at IV-61): (1) the partially completed NTS study, which has to date yielded no field-application or long-term exposure information on low-VOC coatings; (2) sales volume information; and (3) product data sheets, which are little more than marketing materials produced by manufacturers to sing the praises of their own products. None of these is a substitute for a proper analysis of issues raised by industry repeatedly for years, on issues that bear directly on whether mass-based VOC regulations are at all effective, or whether they actually harm the environment.

More Thickness

15-27 Contrary to the Draft EIR's characterization, industry representatives did not "contend that low-VOC waterborne" coatings tend to produce thicker films. This issue was raised primarily with respect to low-VOC high-solids solventborne alkyd coatings, particularly Nonflats. This impact also occurs with two-component high-build Industrial Maintenance Coatings, which are purposely formulated to produce thicker films, typically five to ten times as thick as conventional coatings. The Draft EIR's misstatement of industry's position allowed the it to include data on waterborne coatings in its analysis. By diluting data on the categories of concern with data from many other categories, the Draft EIR was able to conclude that there is not necessarily a relationship between low-VOC levels, thickness, solids, and coverage. Moreover, the Draft EIR does not appear to note that coverage rates are a function of coating solids by volume and dry film thickness, which relates to coating viscosity and application method. Low-VOC high-solids solventborne alkyd coatings typically have high viscosity, and when applied by brush, roller, or spray (unthinned) will tend to produce significantly thicker films than conventional coatings, thus increasing VOC emissions per unit of area covered. The Draft EIR does not analyze this impact.

More Thinning

15-28 the Draft EIR once again mischaracterizes manufacturers' position. Manufacturers did not assert "that thinning occurs . . . in low VOC waterborne" coatings, (EIR at IV-65), but rather in the same types of coatings that would tend to produce more thickness unless thinned in the field beyond manufacturers' recommendations. Coverage rates shown in Table IV-2 are taken from product labels or data sheets, which generally indicate theoretical coverage at the recommended dry film thickness, although actual dry film thickness may vary substantially as applied.

15-29 In addition, CARB's 1991 field study of thinning practices cited in the Draft EIR is seriously flawed. In the study, 121 coatings "were observed being applied" but only 49 were sampled and analyzed for VOC content. Of those 49, 18 were waterborne coatings that would be thinned only with water, not VOC solvents. Four of the remaining 31 solventborne coatings (*i.e.* 13%) had apparently been thinned in excess of applicable limits. Furthermore, the field work in the study was performed by local district enforcement personnel, with authority to issue notices of violation that could result in heavy fines. Many of the painting contractors questioned in the study later admitted to being intimidated by the enforcement officers and therefore were reluctant to disclose actual field-thinning practices. In addition, the study focused on relatively higher-VOC content specialty coatings that are less likely to be thinned than lower-VOC general purpose coatings.

More Priming

15-30 This issue was raised specifically with reference to the increasing use of low-VOC waterborne latex enamels on difficult substrates, including previously enameled surfaces. Such products have demonstrably poorer adhesion than solventborne alkyd enamels, which will adhere adequately to previously enameled surfaces. As a general precaution, it is generally recommended that difficult substrates to be topcoated with latex enamel first be primed, with either solventborne or waterborne primers. Such priming would be unnecessary with a better adhering alkyd enamel. Also, the Draft EIR does not address an additional cause of more priming, namely the relatively poor sealing and stain-blocking properties of waterborne primers.

More Topcoats

15-31 Contrary to the Draft EIR's statement, manufacturers and contractors do not "assert that low-VOC solventborne topcoats may not cover, build . . . or flow-and-level . . . as well as higher-VOC solventborne formulations," (*id.* at IV-68), but rather that waterborne latex topcoats exhibit deficiencies is these areas. Reliance on the preliminary laboratory data from the NTS study is particularly misguided because one of the major flaws of this portion of the study was that all testing panels were prepared by the "drawdown" method (in which a puddle of paint is wiped across the panel surface with a special tool) rather than typical real-world application methods such as brush, roller, or spray. The Draft EIR's assessment of coatings technology "breakthroughs" is unrealistically optimistic, and is not supported by industry experience. The Draft EIR's reliance on the Ventura County Air Pollution Control District ("APCD") study is also misplaced. Paint manufacturers and contractors strongly disagree with the conclusions of the study. The study was severely limited in:

> (1) *The number and type of applications of each product tested*: The study was generally limited to one applications of the waterborne coatings tested, and the specific applications selected avoid the conditions most associated with failure of waterborne coatings, for example: application of latex enamel over surfaces previously enameled with high-gloss alkyd enamel; application of exterior latex

primer and/or enamel over chalky, oxidized substrates; application of interior latex primer and/or enamel to substrates contaminated with residues of oil, grease, or wax; and application of latex sealer to surfaces marked with water soluble stains. Also, none of the coatings tested were subjected to the range of extreme exposure conditions that Industrial Maintenance Coatings are formulated to resist;

15-31 (2) *The timeframe of the tests*: The six month timeframe of the testing project was far too limited to allow for evaluation of long-term durability of the substitute products as compared to higher-VOC products. Durability is the single factor most related to frequency of repainting; and

(3) *The range of products tested*: The study tested almost exclusively waterborne coatings that might be used as substitutes for higher-VOC Quick-dry Enamels, Quick-dry Primers, Industrial Maintenance Coatings, and Lacquer Coatings, the performance problems of which are of a different nature than those associated with complying solventborne coatings that are often the preferred substitute.

More Touch-ups and Repair Work

15-32 Manufacturers and contractors do not "assert that waterborne . . . formulations dry slowly and are susceptible to damage such as sagging, wrinkling, alligatoring . . . or becoming scraped or scratched." These problems were noted with regard to low-VOC high-solids solventborne alkyd enamels. Moreover, as indicated above, the Draft EIR's reliance on manufacturer-produced marketing materials cannot substitute for scientific technical analysis. The preliminary laboratory data from the NTS study is also inadequate for evaluating the coating deficiencies that result in more touch-ups and repair work under real-world application conditions.

More Frequent Recoating

15-33 The preliminary laboratory testing phase of the NTS study, the basis of the Draft EIR's conclusions regarding the durability of low-VOC coatings, was never intended to address the long-term performance issues that relate to more frequent recoating. This is precisely why the NTS study also includes a long-term exposure study phase, which has yet to be initiated. Moreover, coating durability is not simply a question of high-VOC versus low-VOC products. Different types of coatings, formulated from a wide variety of resins, solvents, and other components, characteristically have different levels of VOC content and correspondingly different sets of performance attributes, which make them suitable for different purposes. Coatings that typically have lower VOC content may be fully adequate for certain uses, and yet be utterly inadequate as substitutes for coatings that might be banned on the basis of their higher VOC content. Therefore, while VOC content is not the sole determinant of coating performance, some optimum amount of VOC is necessary to achieve maximum performance in any given type of coating. If a VOC content limit is set below the optimum amount for a particular coating use -- as the proposed SCM would require-- performance is impaired because the best coatings of that type would be banned. When the performance of available substitutes is inadequate, service life is shortened and frequency of recoating is increased. The Draft EIR makes no attempt to analyze this issue by identifying specifically which coatings would be banned by the proposed limits, what the likely substitutes would be, and their respective performance characteristics.

Substitution of Higher VOC Alternatives

15-34 The tremendous variety of architectural coatings available today exists because of market demand for cost-effective solutions to specific performance needs. When a VOC content limit bans the best performing coatings in a given category, substitutes are likely to come from another category, which may have a higher VOC content limit, thereby circumventing the regulation and eliminating VOC the projected emissions reductions. The nature of markets is to seek the greatest value (maximum performance at minimum cost) from the widest possible range of options. The Draft EIR makes no attempt to analyze factors that will determine substitute product selection within the context of all remaining architectural coatings after implementation of the proposed SCM. Instead, the Draft EIR incorrectly assumes that the level of usage of each category will remain constant.

Reactivity

15-35 The Draft EIR admits that "[d]ifferent types of [VOC]s have different degrees of 'reactivity,' which refers to a compound's ability to accelerate the formation of ground-level ozone." (EIR at IV-73). The Draft EIR even acknowledges the existence of "negative reactivity," whereby VOC emissions *suppress* ozone formation under certain conditions. (*Id.* at IV-79). Reactivity and negative reactivity are dependent on factors including the VOC emitted, the presence of NOx, atmospheric conditions, and climate.[7] What the Draft EIR does not do is comprehensively determine the effects of VOC emission reductions across the air districts of California. Instead, the Draft EIR ignores differences in reactivity among VOCs, airsheds, and seasons, to incorrectly conclude that the SCM will not lead to substitution of more reactive VOCs, and that it will not cause increases in ozone levels because of negative reactivity.

15-36 The Draft EIR first argues that although propylene glycol (a primary VOC in waterborne coatings) is two to three times more reactive than "a typical mineral spirit used in solventborne coatings," it is less reactive than some VOCs used in solventborne coatings, such as toluene and xylenes; therefore, its increased use should not increase ozone levels. (*Id.* at IV-73). But the Draft EIR does not mention that mineral spirits compose *80%* of VOCs in solventborne coatings, whereas toluene and xylenes comprise only 4.2%.[8] Therefore, even a significantly smaller volume of propylene glycol in waterborne coatings than mineral spirits in solventborne coatings will have the effect of *increasing* ozone levels due to propylene glycol's higher reactivity.

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[7] *See, e.g.* "Rethinking Ozone" at 116, 154.

[8] Harley, et al. "Respeciation of Organic Gas Emissions and the Detection of Excess Unburned Gasoline in the Atmosphere," 25 Environ. Sci. Technol. 2395, 2398 (1992).

15-37 The draft EIR's comparison of the reactivities of waterborne versus solventborne coatings misstates the nature of the issue. The real issue is whether a probable waterborne substitute for a solventborne product will have equal or greater ozone formation impacts, accounting for differences in both VOC content and VOC reactivity. The comparison given in the draft EIR, contrary to claims made, does not provide "strong evidence that reformulating from solventborne to waterborne coatings to reduce total VOC content is an effective strategy to reduce the ozone formation potential" of architectural coatings. (EIR at IV-73 to IV-74). This is because the comparison deals with currently available coatings in a few categories that include large volumes of low-VOC waterborne coatings intended for specific end-uses within each category, but not intended as substitutes for solventborne coatings formulated for different purposes. For example, the Primer, Sealer & Undercoater category includes a large volume of low-VOC waterborne latex drywall sealer, as well as smaller volumes of high-VOC solventborne specialty primers intended for difficult substrates such as metal, glass, plastic, fiberglass, and surfaces contaminated with oil and grease or high alkalinity. The waterborne coatings in this category have an average actual VOC content of 41 grams per liter (according to the ARB survey of 1996 coatings) and the solventborne coatings have an average actual VOC content of 345 grams per liter. This eightfold difference in average VOC content overwhelms any potential difference in VOC reactivity in the draft EIR's calculations. Several crucial facts, however, are omitted.

First, the average waterborne latex sealer is not a suitable replacement for solventborne specialty products. If a waterborne substitute were to be specially formulated, its VOC content would likely be at or near the proposed VOC content limit of 200 grams per liter. (In fact, projected emission reductions are calculated on the assumption that products with VOC contents above the applicable limit will be replaced by coatings formulated at the limit.) Second, solventborne coatings typically have solids content that is 1.5 to 2 times greater (by volume) than waterborne coatings, which means that it takes 1.5 to 2 gallons of waterborne coating to replace one gallon of solventborne product. Finally, most solventborne products contain only mineral spirits, and waterborne products typically contain glycol compounds as the principal cosolvent. Thus, if glycol compounds are assumed to be "two to three times more reactive than a typical mineral spirit," the waterborne replacement at 200 grams per liter could have as much as 1.74 times more ozone formation potential than the solventborne product at 345 grams per liter.

15-38 Finally, the Draft EIR suggests that recent work by Dr. Carter indicates that some mineral spirits may be more reactive than previously thought. (EIR at IV-74). The Study cited by the Draft EIR, however, discusses *computer modeled* estimated reactivities for certain mineral spirits. These findings conflict with Dr. Carter's direct air chamber reactivity measurements for mineral spirits, which demonstrate that mineral spirits are either negatively reactive or cause "essentially no change in the final [ozone] levels."[9]

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[9] William P.L. Carter, et al., "Investigation of the Atmospheric Ozone Forming Potentials of Selected Mineral Spirits Samples," at 37-38 (1997).

Negative Reactivity

15-39 The Draft EIR acknowledges that VOC emissions can reduce ozone levels (*i.e.* VOCs are "negatively reactive") under certain conditions, *(id.* at IV-79), but nowhere indicates when, where, or how often those conditions occur in California. The Draft EIR does note (without citation or support) that negative reactivity is not "commonly" found in "ozone *non-attainment urban* areas," (*id.*), but makes no statement regarding negative reactivity in *all other areas of California --the vast majority of the state*. Absent a full analysis of the conditions under which negative reactivity occurs and the prevalence of those conditions in California on a regional basis, the Draft EIR cannot know whether the SCM will result in increased ozone levels.

The Effectiveness of Mass-Based Controls for Reducing Ozone

15-40 The Draft EIR reasons that because mass-based VOC control strategies have been somewhat effective in the past, they are the preferred alternative for the SCM. In the sweeping evaluation of the success of all past regulation in the aggregate, the Draft EIR makes no effort to distinguish the effectiveness of mass-based architectural VOC control strategies from mass-based mobile source control strategies or any other control strategies. This omission is crucial, especially given that different sources emit different VOCs which have different effects on ozone levels. Some VOCs can cause up to an order of magnitude more ozone than others,[10] and some VOCs are negatively reactive. The mass-based SCM "do[es] not selectively remove VOCs" through its regulation, (EIR at IV-79); therefore, CARB does not know whether its stringent VOC limits will cause the removal of highly reactive, negligibly reactive, or negatively reactive VOCs or whether coatings will be reformulated with more reactive VOCs, thereby increasing ozone levels. The Draft EIR's one paragraph discussion supporting the SCM's mass-based approach is sorely lacking.

Health and Safety

15-41 It is anticipated that the SCM will result in substitution of acetone (an exempt solvent) for other VOCs in architectural coatings. According to a recently published evaluation of the hazard potential of solvents, acetone was found to be 25 times more hazardous than mineral spirits. *See* enclosed article on "Systematic Evaluation of the Hazard Potential of Solvents," Paint & Coatings Industry Magazine, March 2000. Nonetheless, in assessing the health and safety risks of using acetone as an exempt solvent in architectural coatings, the Draft EIR concludes that "[p]otential hazards impacts resulting from implementing the SCM are not expected to be significant" because the "increased use of acetone will generally be balanced by reduced usage of other equally or more hazardous materials such as MEK, toluene, xylenes, etc." (EIR at IV-107). Contrary to the Draft EIR's characterization, however, if the SCM's VOC content limits for major categories were implemented (without a viable averaging provision), acetone would serve as a replacement primarily for mineral spirits (paint thinner), not MEK, toluene, and

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[10] *See* EPA, "Study of Volatile Organic Compound Emissions From Consumer and Commercial Products," Report to Congress, at 3-5 (March 1995).

xylenes.[11] This replacement of mineral spirits with acetone would be widespread,[12] and would result in considerably increased health and safety hazards.

CHAPTER V – PROJECT ALTERNATIVES

Alternatives Rejected as Infeasible

Performance-Based Standards

15-42 Industry has often suggested that mass-based VOC regulations are an extremely inefficient method for reducing VOC emissions, because reductions in VOC content of coatings may lead to increased paint use. For example, reducing the VOCs in a can of paint by 50% can be environmentally harmful if more than twice as much paint is necessary to complete a job. To properly evaluate the effectiveness of the SCM, therefore, the Draft EIR must determine not only the level of VOC emission reductions from a given volume of paint, but also changes in the amount of paint required to complete a given job, as affected by changes in product performance, including reduced coverage and the need for more coats, more thinning, more priming, more touch-ups, or more frequent recoating. Consistent with these considerations, the proper measure of emissions potential is emissions per area covered divided by service life.

The Draft EIR rejected a performance-based alternative "because no consensus could be reached" regarding measurement of performance standards. (EIR at V-139). This excuse disingenuously ducks the issue. As indicated by this comment letter, no "consensus" has been reached on many of the issues included in the SCM. Moreover, ARB staff never attempted to generate a consensus on this issue, instead they rejected this alternative out of hand. Without performance-based standards, however, the potential exists for the SCM to yield adverse environmental impacts due to increased paint usage. The Draft EIR's refusal to seriously consider a performance-based alternative is not consistent with the requirements of CEQA.

Seasonal Regulation

15-44 There is no disagreement that ozone is a problem during only a few (primarily summer) months of the year, when atmospheric and climatic conditions are conducive to ozone

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15-43 [11] Mineral spirits represent approximately 80 percent of the volume of solvents used in solventborne architectural coatings. In aggregate, MEK, toluene, and xylenes make up only five percent. Harley, et al. "Respeciation of Organic Gas Emissions and the Detection of Excess Unburned Gasoline in the Atmosphere," 25 Environ. Sci. Technol. 2395, 2398 (1992).

[12] For example: a typical solventborne Primer, Sealer & Undercoater formulated with mineral spirits to meet the current limit of 350 g/L could be reformulated to meet the proposed limit of 200 g/L by replacing half the mineral spirits with acetone. This would greatly increase the product's potential health and safety impacts.

formation. For this reason, industry has long suggested that regulators should adopt a seasonal approach to regulating architectural coatings.

15-44 The Draft EIR rejects this alternative for a number of reasons. First, the Draft EIR suggests that manufacturers may have difficulty managing their inventory to comply. (EIR at V-139). Of course, if this were a real issue, manufacturers could avoid the problem by producing compliant coatings year-round. Second, the Draft EIR suggests that it is "not realistic" for individual painters to know when they may use a particular can of paint. The Draft EIR offers no explanation why labeling will not solve this problem -- in fact, the Draft EIR relies on the ability of paint users to follow instructions regarding thinning requirements to justify other aspects of the Draft EIR. (*Id.* IV-65 to IV-67). Finally, the Draft EIR suggests that enforcement would be difficult. (*Id.* at V-139). The Draft EIR does not discuss any possible enforcement mechanisms and does not estimate the cost or otherwise quantify the "difficulty" associated with a seasonal system. This is unfortunate given the potential cost savings of seasonal regulation.

Regional Regulation

15-45 Industry has suggested that the SCM should be tailored to optimally regulate (or not regulate) VOCs according to the unique atmospheric conditions of each air district. The Draft EIR rejects this alternative because it would be difficult to enforce and because of the difficulty modeling the effects of the SCM in various regions.

The Draft EIR's analysis raises more questions than it answers. If it is too difficult for the Draft EIR to predict the effects of regulation in various regions of the State -- *how can it rationally project state-wide environmental impacts of the SCM?* This is an excellent example of the kind of information that the new air chamber at the University of California at Riverside will help generate. Dunn-Edwards suggests that CARB postpone issuing a state-wide SCM for architectural coatings until the necessary data gaps regarding regional effects are filled.

Exceedance Fees

15-46 The Draft EIR rejects as infeasible an exceedance fee approach whereby manufacturers could pay a given fee to enable them to produce coatings with VOC content higher than the limits specified in the SCM. The Draft EIR's rejection of this alternative as "infeasible" is puzzling, given that an exceedance fee provision is included in EPA's national architectural coatings rule. (*Id.* at V-140). The Draft EIR states that the fee under the national rule is too low, but that alone is not sufficient basis for rejecting this alternative altogether. Instead, CARB could institute a higher fee. The SCM's failure to include an exceedance fee option potentially has adverse environmental consequences because it precludes manufacturers form producing high quality coatings that do not meet the SCM's technologically infeasible limits. The resulting use of less durable inferior coatings could lead to the use of more paint and higher VOC emissions.

The LVP-VOC Exemption

Both EPA and CARB currently include exemptions for low vapor pressure ("LVP") VOCs in their Consumer Products regulations. (EIR at V-142 to V-143). This sets the legal and technical precedent for the inclusion of an LVP exemption in other regulations, including the SCM. Therefore, it is unclear, technically, why this alternative is being discarded by the Draft EIR as "infeasible" as part of the SCM. (*Id.* at V-141).

The Draft EIR argues that "regulatory consistency" would not be achieved by including a LVP exemption in the SCM, "because other regulations relating to architectural coatings . . . do not have such an exemption" currently. (*Id.* at V-143). These arguments are unavailing for at least two reasons. First, one purpose of the SCM is to *bring* consistency to architectural coatings regulation in California, (*see, e.g. id.* at V-168); therefore, the absence of consistency among existing rules is hardly a reason not to consider the LVP-VOC exemption in the SCM. Second, this "bait-and-switch" tactic obscures the real 15-47 issue, which is not consistency but rather equity: equal treatment for all similarly situated parties. As the Draft EIR explains the rationale for the consumer products LVP-VOC exemption, ARB staff "wanted to streamline the regulatory development of the consumer products regulation, minimize the impacts on industry, and provide formulation flexibility to manufacturers. It was felt that all of these goals could be accomplished by including the LVP-VOC exemption in the consumer products regulation, and thereby concentrate the regulatory effort on the higher volatility VOCs that were of the most concern for air quality." (*Id.* at V-145).

All of this rationale applies equally well to architectural coatings. The Draft EIR attempts to distinguish consumer products from architectural coatings by arguing that consumer products are essentially different in form and use. Many consumer products, however, are inherently "coating-like" -- they are applied to a surface and harden or cure by drying after application. Such products include: floor polishes, sealers, and waxes; adhesives; sealants and caulking compounds; and fabric protectants. Like consumer products, architectural coatings also contain a range of low volatility to high volatility compounds, with low volatility compounds making up a relatively small fraction of total VOC contents. LVP-VOCs in architectural coatings are used primarily as cosolvents in waterborne coatings, which have long been favored by regulators for their lower average VOC content. Exemption of LVP-VOC would greatly enhance formulation flexibility for these products, and thereby minimize regulatory impacts on both industry and consumers.

The Draft EIR further argues that "U.S. EPA does not support an LVP-VOC exemption for architectural coatings" because EPA Test Method 24 "is available to measure the 15-48 VOC content of architectural coatings" and this method supposedly "accounts for the volatility of solvents. Solvents that do not volatilize under Method 24 are not measured as VOC." U.S. EPA also believes that a general exemption for low volatility compounds would be inappropriate because these "compounds, under certain processes, would volatilize and participate in photochemical reactions." The "certain processes" alluded to, however, involve high temperatures and hot gas emissions. Architectural coatings are not heated during or after application, but Method 24 specifies that the paint sample must be heated above the boiling point of water, to 110 degrees Centigrade (230 degrees

Fahrenheit) for one hour, thus driving off compounds that would not volatilize to the same extent, or at all, under normal application conditions.

15-48 This is confirmed in various indoor air quality studies, including ARB's commissioned study on "Common Indoor Sources of Volatile Organic Compounds: Emission Rates and Techniques for Reducing Consumer Exposures," (Lawrence Berkeley National Laboratory, January 1999). This study demonstrated that only approximately 10 to 30 percent of latex paint LVP-VOC cosolvents are emitted during a two-week period following application to interior drywall. The report also states: "At present, it is not known whether 100 percent of the [cosolvents] absorbed by gypsum board are re-emittable." Even if the cosolvents were later emitted at much lower rates over much longer periods, most of the emissions would be occurring at times when they have no potential to contribute to ozone formation, *i.e.* during non-ozone season.

15-49 Ultimately, failure to grant an exemption for LVP-VOCs in architectural coatings is counterproductive to optimizing the performance of waterborne coatings, thus adding to total ecological burdens of paint production, distribution, and use. Consequent impacts would affect not only air quality, but also water quality, material and energy resource consumption, health and safety, and solid waste disposal.

Reactivity-Based VOC Limits

15-50 Dunn-Edwards supports CARB's stated commitment to studying reactivity issues and pursuing the possibility of implementing a reactivity-based architectural coatings rule. However, Dunn-Edwards disagrees with the Draft EIR's conclusion that such a reactivity-based rule is not already feasible for architectural coatings. Five years ago, Ted Russell's article in *Science* magazine concluded that reactivity-based architectural coatings regulations were feasible *at that time*.[13] CARB's subsequent experience with reactivity-based regulations in other fields, (EIR at V-152), should only make it easier for CARB to institute a similar regulation for architectural coatings. The Draft EIR contends that information limitations of existing coatings' VOC inventories and reactivity data prevent CARB from instituting a reactivity-based regulation immediately. Dr. Russell's article concludes that sufficient information currently exists. Any data gaps can be temporarily filled using reasonable assumptions or can be efficiently and quickly generated.

15-51 When CARB does institute a reactivity-based regulation, Dunn-Edwards urges CARB to reconsider its apparent decision to the use of the Maximum Incremental Reactivity ("MIR") scale for characterizing the reactivity of VOCs. The MIR scale is valid only for an extremely narrow range of environmental conditions, found most often in the laboratory but not in the real world (except perhaps on occasion in a few heavily polluted urban cores). Under the ambient conditions that predominate throughout California -- specifically, low NOx or high VOC/NOx ratio conditions -- use of the MIR scale misrepresents real-world conditions and, if incorporated into regulations, might be counterproductive. VOC reductions in areas characterized by such conditions can

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[13] A. Russell, et al., "Urban Ozone Control and Atmospheric Reactivity of Organic Gases", Science, July 28, 1995, at 491

promote rather inhibit ozone formation due to environmentally-dependent negative incremental reactivity of most VOC solvents, including mineral spirits.

Alternatives Considered Feasible

Alternative A – No Project Alternative

15-52 The analysis of impacts and air quality benefits associated with each alternative is technically inaccurate and misleading to decision makers. Table II-1 summarizes CARB survey data which indicates that emissions from architectural coatings have decreased 9 tons per day between 1990 – 1996 or 1.25 percent annually in the absence of regulation. Therefore, Table V-3 inaccurately characterizes the No Project Alternative as having no emission reduction potential. This is untrue both because market forces are reducing VOC content in coatings regardless of regulation, and because the national rule is effective in one-half of all California air districts. Allowing consumer demand for waterborne products to continue to drive the market could result in more emission reductions than those expected to be achieved through implementation of the SCM.

Alternative D – Product Line Averaging

15-53 The Draft EIR rejects product-line averaging as an alternative to the SCM at this time, despite recognizing that it is a feasible alternative which would "improve cost-effectiveness of the rule." (EIR at V-138 to V-139). Product line averaging is viable and necessary to achieve any emission reductions at all from this proposed rulemaking because, without product-line averaging, the proposed emission limits are technologically infeasible.

15-54 The Draft EIR declares that "the existence or absence of averaging does not affect either the ARB's analysis of the technical feasibility of VOC limits in the SCM, or the ARB's environmental analysis for the SCM." Dunn-Edwards strongly disagrees. The SCM's proposed VOC limits are based on the SCAQMD's May 1999 amendments to Rule 1113. Unlike the SCM, however, Rule 1113 includes an averaging provision which allows manufacturers meeting certain conditions to distribute coatings with VOC contents above the limits, so long as each manufacturer also distributes sufficient volumes of coatings below the limits to offset the higher VOC products, so that product lines comply with their limits on average. As explained at pages 6 to 8 above, many of the VOC content limits in the proposed SCM -- without a viable averaging provision like that contained in Rule 1113 – are beyond the scope of technological and economic feasibility, and into the realm of environmental counterproductivity. For example: the limits would ban more than 50 percent of all currently available Flat Coatings; 65 percent of Quick-Dry Primers, Sealers & Undercoaters; 72 percent of Industrial Maintenance Coatings; 97 percent of high-gloss Nonflat Coatings; and 100 percent of Quick-Dry Enamels. These product bans could become effective in as little as two or three years after local districts in California adopt or amend their local rules in conformance with the SCM. This period would be much too short to formulate, field-test, and market new, adequately performing, compliant coatings -- even if such products were possible within the constraints of currently available coatings technology (which they are not), and available financial resources. Available studies do not support the assumption that the SCM's VOC limits are achievable absent this averaging provision. As also discussed above, if the limits are not feasible, adverse environmental effects will result.

15-55 According to the Draft EIR, "ARB staff is not considering using the Rule 1113 averaging approach in the proposed SCM." Although no averaging provision is included in the SCM currently, ARB staff is apparently considering an alternative averaging program that, in our opinion, would be excessively complex, burdensome, inefficient, and inequitable. Absent the details of the averaging provision under consideration, Dunn-Edwards corporation is unable to provide further comment at this time.

Technology Assessments

15-56 Dunn-Edwards urges CARB staff to consider including a provision encouraging local districts to perform Technology Assessments to ensure that high quality, durable coatings are available in the future.

15-57 As demonstrated above, the Draft EIR is insufficient to inform the ARB and the public regarding the potential significant adverse environmental effects of the SCM. CARB should revise and re-submit for further public comment the Draft EIR before moving ahead to finalize the proposed SCM. The new Draft EIR should accurately describe the environmental effects of the SCM, including detailed discussions regarding the different effects of VOC reductions in different areas of California; the environmental effect of the SCM in light of varying NOx levels and NOx transport across California; and the possible effects on coating usage (and so VOC emissions) that could result from the enforcement of the technologically infeasible VOC content limits set by the SCM.

15-58 Dunn-Edwards appreciates CARB's efforts in examining innovative and meaningful approaches to dealing with ozone nonattainment. We look forward to working with you on this and other important issues. These issues are the keys to the viability of our industry and our mutual goal of clean air.

Sincerely yours,

Howard Berman

Howard Berman
Senior Vice President and
Environmental Counsel

Systematic Evaluation
of the Hazard Potential of Solvents

By Nicholas Kob / R&D Chemist, DuPont Nylon Intermediates and
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There is an increased awareness around environmental protection and worker safety,[1] which has led to increased debate about which solvents are appropriate and safe to use in a number of applications and situations.[2,3] The government has taken the lead regulating the use of several solvents, such as 1,1,1-trichloroethane, which, effective Dec. 31, 1995, was phased out under the Clean Air Act of 1990. Also, numerous solvents have been labeled as suspected carcinogens. To users it is clear what the hazards are for these chemicals, and that their use presents an unsafe working environment. However, a clear understanding of a solvent's safety or potential risk as described above is the exception rather than the rule. In most cases it is extremely difficult to accurately evaluate the safety in the workplace of using one solvent vs. another. Generic phrases such as low toxicity, high flash point and low VOCs are used by many solvent manufacturers to describe solvents, but in many cases it only adds to the user's confusion. These descriptions are relative and are not based on scientific definitions, leaving users confused about the actual health and safety effects.

Small- to medium-sized companies often can not afford, and/or find it is too time consuming to have a safety, health, and environmental (SHE) expert employed to guide solvent selection. External consultants are an option, but many times they are too costly for smaller companies. Given this situation, many stay with their existing solvent formulations as long as they remain legal, even if they present possible safety and/or health risks of which they are unaware.

This article describes a new tool that can easily and more accurately evaluate the risk potential of solvents and aid in the selection of safer replacement solvents. The parameters describe a vapor hazard ratio (VHR) and a solvent hazard parameter (SHP), which are based on existing guidelines to classify solvents according to their hazard potential.

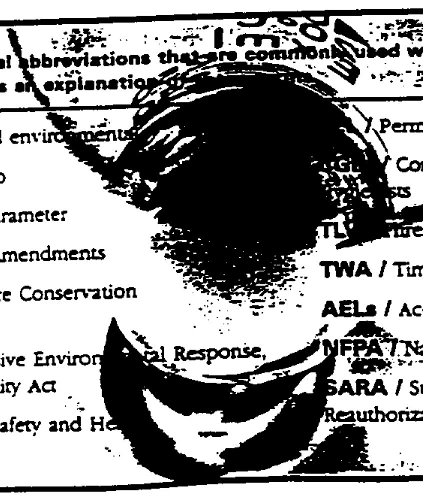
Discussion

Numerous lists have been established that serve as guides for the selection of safe solvents.[4] These include VOCs; HAPs; Clean Air Act Amendments (CAAA) of 1990; the federal Resource Conservation and Recovery Act (RCRA); the federal Clean Water Act; and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). In addition to these lists, the Occupational Safety and Health Administration (OSHA) has set permissible exposure limits (PEL) on chemicals, and CGIH (Conference of Governmental Industrial Hygienists) has set chemical threshold limit values (TLV). It is easy to see how one can be overwhelmed when attempting to evaluate a solvent's hazard potential.

The TLV refers to airborne concentrations of substances and represents conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without any adverse effects. Most TLVs are expressed as a time-weighted average (TWA) value, as this provides

LIST OF TERMS

This articles uses several abbreviations that are commonly used when discussing solvents and chemical regulations. Following is an explanation [illegible]



SHE / Safety, health, and environments
VHR / Vapor hazard ratio
SHP / Solvent hazard parameter
CAAA / Clean Air Act Amendments
RCRA / Federal Resource Conservation and Recovery Act
CERCLA / Comprehensive Environmental Response, Compensation and Liability Act
OSHA / Occupational Safety and He[illegible] Administration
[illegible] / Permissible exposure limits
CGI[illegible] / Conference of Governmental Industrial [illegible]ists
TL[illegible] / [illegible]reshold limit values
TWA / Time-weighted average
AELs / Acceptable exposure limits
NFPA / National Fire Protection Association
SARA / Superfund Amendments and Reauthorization Act

the most practical way of monitoring the airborne reagent for compliance with the limits. The method most commonly used in the United States to evaluate a solvent's health hazard potential is by comparison of the chemical threshold limit values (TLV). Other countries establish their own exposure limits for chemicals, which are used similarly to the TLVs in the United States.

Many times a comparison of TLV alone can mislead people on the safety aspects of using one solvent vs. another. For example, if Chemical A has a TLV of 100 ppm and Chemical B has a TLV of 10 ppm, a conclusion could be drawn that chemical A is safer. However, this may or may not be correct since the TLV describes only the exposure limit and not how fast that limit is achieved. The vapor pressures of the solvents also need to be considered in order to describe accurately which solvent is safer. To further complicate the issue, no TLV values exist for many of the commonly used solvents.

DuPont internally evaluates the safety of chemicals for workers and the environment. Through its Haskell Laboratory, the company has for the last 20 years been studying the acute, subchronic, reproductive, mutagenic and other toxicological effects of chemicals. From these studies, the acceptable exposure limits (AELs) are determined for chemicals. These are DuPont's internal exposure limits. AELs are guidelines based on informed judgment, and are not fine limits between safe and dangerous concentrations. They are not for use as relative toxicity indexes, limits for continuous uninterrupted exposure, or proof or disproof of health effects. TLVs for many chemicals have not been established, and for those chemicals AEL values are used to guide worker safety in DuPont, and will be used in this article.

The boiling point of a solvent is often overlooked by many people who do not recognize that a high exposure limit may be reached quite quickly at ambient temperature and pressure conditions. People feel much more comfortable working with a chemical that has an exposure limit of 100 ppm than one that has an exposure limit of 5 ppm. It is counter-intuitive to most people that the solvent with the 5 ppm exposure limit may be safer to work with because its limit is reached more slowly. The problem is that no easy method exists to help users evaluate solvents that is based on the exposure limit, and the rate at which the limit can be achieved at a given set of conditions. In Germany a parameter referred to as the vapor hazard ratio (VHR) is used, which is the quotient of the saturation concentration and the exposure limit,[5] and addresses the previously described deficiency.

VHR = (saturation concentration, ppm) / (exposure limit, ppm)

The saturation concentration is the amount of chemical that is present at chosen conditions in a given volume of air, and is based on the vapor pressure of the solvent at the chosen conditions. It is easily calculated for any solvent using the following equation.

Saturation concentration, ppm = (vapor pressure, mmHg / 760)X10^6

The vapor hazard ratio reflects the risk potential of a solvent in terms of not only the exposure limit but also the rate at which that limit is achieved. Table 1 lists some of the more commonly used solvents and their associated VHR; solvents with lower VHR values have a lower potential health risk (are safer to use). For example, based solely on the exposure limit (TLV) one would consider acetone to have the lowest risk potential, but the VHR correctly shows that it has a much higher risk potential than a number of solvents. DuPont Dibasic Ester (DBE) solvent has a low exposure limit (as set by its AEL) but the VHR ratio correctly shows that it is one of the lowest potential health risk solvents.

Although the VHR correctly describes the risk potential based on exposure limits, it fails to describe other hazards that should be considered to ensure the safest workplace possible. A common concern when using solvents is the risk of fire. Every year numerous injuries occur as the result of a fire involving a solvent. We feel this is an additional parameter that an employer should consider to more accurately describe the risk potential of a solvent. The National Fire Protection Association (NFPA) has established a set of criteria for evaluating the fire hazards of solvents and other materials. It is based on the susceptibility of a material to burning. The following rating is based on the NFPA criteria, and ratings for any solvent/chemical can be found on the MSDS for that chemical.

0 — Materials that will not burn.

1 — Materials that must be preheated before ignition (flash pt. above 100°F).

2 — Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition (flash point between 73–100°F).

3 — Materials that can be ignited under almost all ambient temperature conditions (flash point below 73°F (22.8°C) and boiling point above 100°F).

4 — Materials that rapidly or completely vaporize at ambient conditions, and burn readily (flash point below 73°F (22.8°C) and boiling point below 100°F).

The solvent hazard parameter (SHP) is the VHR multiplied by the fire hazard rating, and is another method for assessing the risk potential of a solvent since it combines the health exposure and fire hazards. A listing of the SHP values for a number of the more common solvents is shown in Table 1, with the lowest SHP values corresponding to the lowest risk potential for a chemical (safest to use). The table is organized such that the lowest SHP solvent is at the top, and the highest SHP solvent is at the bottom.

It is important to state that the SHP values and VHR values do not completely describe all the hazards or parameters that an employer should consider. Other possible hazards/factors include chemical incompatibility, reaction with the process or other solvents, and the biodegradability of the solvent.

One must also consider that many chemicals have ceiling limits of exposure. The exposure limit also does not describe the health hazard effects to an individual if the exposure limit is exceeded. For example, one chemical's TLV could be set to protect workers from skin irritation while another could be set due to toxicity. Employers/workers, in addition to looking at the VHR and SHP (which are based on exposure limits) should consult the MSDS to determine the human health effects associated with exceeding the exposure limit. The Superfund Amendments and Reauthorization Act (SARA) requires that some chemicals be disclosed as toxic under SARA

Table 1 / Risk Potentials of Commonly Used Solvents

Solvent	•TLV/AEL (ppm)	Vapor Pressure (mmHg)	Saturation Conc. (ppm)	VHR	Flammability Rating	SHP	SARA 313 Listed
TPM	100	0.03	39	0.39	1	0.39	No
Propylene carbonate	20	0.02	26	1	1	1	No
•DB	5	0.02	26	5	2	10	Yes
DPM	100	0.6	723	7	2	14	No
DuPont DMPD	5	0.07	92	18	1	18	No
•NMP	25	0.3	394	16	2	32	Yes
•Solvesso 150	50	1	1,316	26	2	52	No#
•DMSO	10	0.6	789	79	1	79	No
Mineral spirits	100	3	3,947	39	2	78	No
•DuPont DBE	1.5	0.1	131	87	1	87	No
EB	20	0.6	789	39	2	78	Yes
•d-limonene	50	2	2,632	53	2	106	No
Isophorone	25	1	1,316	53	2	106	No
PM	100	11	14,473	144	3	432	No
DMAc	10	2	2,632	263	2	526	No
DMF	10	3	3,947	395	2	790	Yes
EEA	5	2	2,632	526	2	1,053	No
PMAc	10	4	5,263	526	2	1,053	No
MIBK	50	15	19,737	395	3	1,185	Yes
MEK	200	70	92,105	461	3	1,382	Yes
Acetone	500	248	326,316	653	3	1,959	No
EE	5	4	5,264	1,053	2	2,106	Yes
Toluene	50	28	36,842	737	3	2,211	Yes
Methanol	200	127	167,105	836	3	2,508	Yes
Methylene chloride	50	350	460,526	9,210	1	9,210	Yes
Benzene	1	95	125,000	125,000	3	375,000	Yes

Increasing Safety ↑

• DuPont AEL exposure limits were used since no TLV values available.

- Naphthlene contained in product is SARA 313 listed

TPM – tripropylene glycol methyl ether
DB – diethylene glycol butyl ether
DPM – dipropylene glycol methyl ether
DMPD – Dimethyl-2-Piperidone
NMP – N-Methyl-2-pyrrolidone
DMSO – Dimethyl Sulfoxide
DBE – DuPont's dibasic ester
EB – ethylene glycol butyl ether
PM – Prolylene glycol methyl ether
DMAc – N,N-Dimethyl acetamide
DMF – N,N-Dimethylformamide
EEA – ethylene glycol ethyl ether acetate
PMAc – propylene glycol methyl ether acetate
MIBK – methyl isobutyl ketone
MEK – methyl ethyl ketone
EE – ethylene glycol ethyl ether

Figure 1 / Hansen Solubility Parameter Map

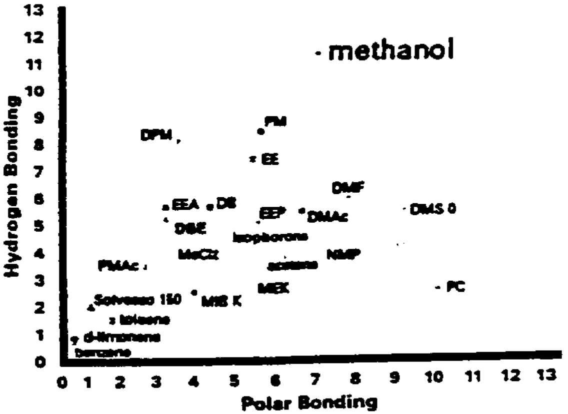
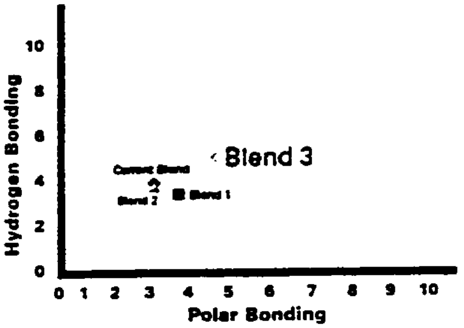


Figure 2 / Low Risk Solvent Blends for Paint Stripping



313. The chemicals that require disclosure under SARA 313 are indicated as such in Table 1. Solvents with a low VHR and SHP (safer solvents) are not listed on SARA 313 (with a few exceptions) consistent with the indication of a solvent's safety given by these metrics.

The following examples show how the VHR and SHP can be easily and proactively used to develop safer solvent formulations. Hansen solubility parameters are used to classify solvents in terms of their nonpolar, polar and hydrogen bonding characteristics.[6] They provide a systematic method that can be used to search for substitute solvents, or determine the solubility of a resin in a solvent or solvent blend. Figure 1 shows the location of a number of the commonly used solvents in terms of their Hansen polar and hydrogen bonding characteristics.

Replacement of a Solvent Blend in a Paint Stripping Application

A typical paint stripping blend (labeled current blend in Figure 2) is shown in Table 2.

An exposure limit (TLV or AEL) for a liquid mixture can be calculated on a time-weighted average exposure basis assuming the atmospheric concentration is similar to that of the original mixture (all the liquid mixture eventually evaporates). When the percent composition (by weight) is known the exposure limit of the mixture is determined by the following equation.

$$\text{Exposure limit mixture} = 1/[(fa/TLVa) + (fb/TLVb) + (fc/TLVc) + \ldots(fn/TLVn)]$$

(where fn is the weight fraction of component n and TLVn is the exposure limit of component n.)

However using a TLV exposure limit for a liquid mixture presents the same limitations when trying to evaluate the potential health risk of the mixture as in the case of a pure chemical. Following is an alternative method using the VHR in place of the TLV to more accurately reflect the health risk a solvent mixture poses.

Using a solvent formulation program (DuPont as well as many other companies offer such services to customers), the Hansen parameters for the above hypothetical solvent blend is found to be nonpolar 8.6, polar 2.3 and hydrogen bonding 3.2. Figure 2 shows the location of the blend on a solubility map. The Hansen parameters describe the solvency of the solvent blend and it is desired that a replacement solvent/blend have similar Hansen parameters to perform adequately. Table 1 reveals that although methylene chloride and toluene have TLV values that are mid-range compared to the other solvents, their VHR and SHP reveal these solvents to have a high potential health risk. Generally, the replacement solvent blend must have similar solvency (Hansen parameters) to perform adequately. As is almost always the case there is no single correct answer for a replacement solvent in a blend. A few possible answers are shown in Table 3.

$$\text{Exposure limit mixture} = 1/[(fa/VHRa) + (fb/VHRb) + (fc/VHRc) + \ldots(fn/VHRn)]$$

Comparison of the VHR and SHP values shows the proposed formulations to be solvent blends of lower hazard potential than the current blend. Calculation of the exposure limits for the solvent blends confirms the conclusion shown in Table 4.

The Hansen parameters for the proposed solvent

Table 2 / Solvent VHRs and SHPs

Solvent	Solvent VHR	Solvent SHP
30% Methylene chloride	9,210	9,210
40% Toluene	737	2,211
30% MEK	461	1,382

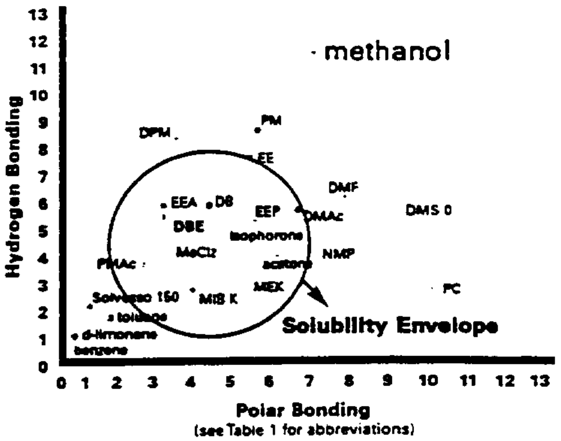
blends 1-3 are shown in Figure 2.

A solvent blend SHP can be calculated by either measuring or calculating the flash point for the solvent blend and using the ratings previously described in this article to assign a fire flammability rating. Then multiply the flammability rating by the VHR for the blend.

Replacement of Solvent Blend in a Coatings Application

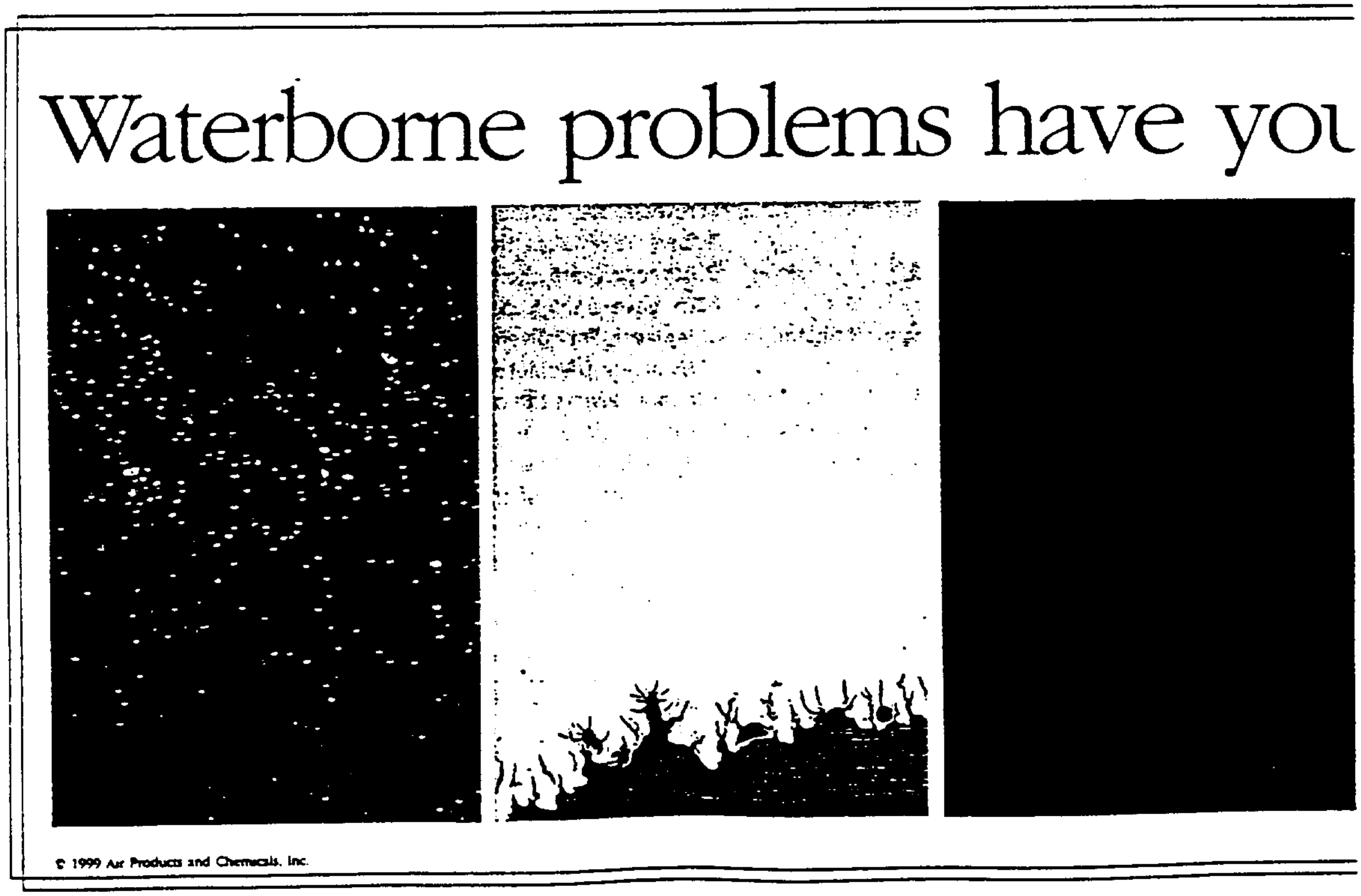
Isophorone is a solvent that many coatings formulators have replaced or want to replace in their existing formulations. A replacement blend must meet criteria such as evaporation time and evaporation profile, and leave a defect-free coating. Replacing isophorone the highest boiling solvent or tails solvent in the blend with another good tails solvent is crucial to the replacement blends performance. Often isophorone can be replaced by DuPont DBE or another high boiling solvent of low health hazard potential.

Figure 3 / Solubility Envelope for a Resin



Cleaning of Equipment or Tools

Acetone is commonly used in the fiber-reinforced plastics industry as a cleanup solvent. However, inspection of Table 1 shows that acetone is high risk potential mainly due to its flammability and low flash point. Acetone has Hansen parameters of nonpolar 8.0, polar 5.2 and hydrogen bonding 3.5. The DuPont computer solvent formulation program is used to establish the solubility envelope



for a given resin by testing its solubility in a number of solvents of differing Hansen parameters. The solubility envelope encloses (in a circle) the solvents or blends that would dissolve the resin. As shown in Figure 3, DBE as well as other solvents could be good replacements in this particular example. Solvent blends can be effective even if one or more of the components of the blend are not in the resins solubility envelope. For example, in Figure 3, propylene carbonate is not in the solubility envelope, but a 60% DBE and 40% propylene carbonate blend has solubility parameters that fall in the envelope (calculated using the computer program). The DBE or DBE-propylene carbonate blend has a much lower health hazard potential than acetone, and in this case would be just as effective a cleanup solvent. As was the case for paint stripping, several possible blends or solvents could be used in this application.

Conclusion

Worker safety and environmental preservation are two of the most important parameters used in the selection of solvents for processes by employers. We propose the use of two easily calculated metrics VHR and SHP as tools for

Table 3 / Solvent Blend VHRs and SHPs

Blend #	**Solvents**	**Solvents VHR**	**Solvents SHP**
Blend 1	35% d-limonene	53	106
	35% DuPont DBE	87	87
	10% Propylene carbonate	1	1
	20% NMP	16	32
Blend 2	40% DuPont DBE	87	87
	20% NMP	16	32
	40% Solvesso 150	26	52
Blend 3	35% DuPont DBE	87	87
	30% DMSO	79	79
	15% DPM	7	14
	20% Mineral spirits	39	78

Table 4 / Solvent Blend Exposure Limits

Solvent Blend	**Blend exposure limit (using VHR)**
Current Blend	816
Blend 1	8
Blend 2	29
Blend 3	15

workers and employers because they show more clearly a solvent's potential health hazards to workers. The metrics are based on exposure limits and physical properties for a given chemical, and their use is not limited to solvents. Further, since many countries establish their own exposure limits this approach can be used globally (using local exposure limits) to evaluate and compare solvents. We also advise that in addition to VHR and SHP parameters, one should read the chemical's MSDS and consider other risk factors such as carcinogenity, biodegradability, and chemical reactivity. ≘

Acknowledgement

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For more information on solvents, contact DuPont, PO Box 1089, Orange, TX 77631; phone 800/231.0998; visit dupont.com/intermediates; or **Circle Number 92.**

Authors' Note

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Common Indoor Sources of Volatile Organic Compounds: Emission Rates and Techniques for Reducing Consumer Exposures

EXCERPT

Final Report

Contract Number 95-302

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DISCLAIMER

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ABSTRACT

This investigation characterized the emissions of volatile organic compounds (VOCs) from interior latex paints and newly manufactured carpet and vinyl flooring materials that are representative of materials widely used in California. Specimens of three or more materials in each major source category were obtained and screened for their emissions of VOCs over 48 or 96 hours using small-scale chambers. Forty-five experiments were conducted with 24 primary materials. Seventeen of the VOCs measured have been identified as toxic air contaminants by the California Air Resourses Board. Based on small-chamber results, a paint combination, a carpet assembly, and a vinyl flooring assembly were selected for investigation in large-scale chamber experiments designed to simulate conditions in a small residential room environment. Thirteen large-scale experiments were conducted to provide real-world emissions data and evaluate the effectiveness of several techniques that consumers might use to reduce concentrations of VOCs and their cumulative exposures to these compounds. The exposure reduction techniques included additional ventilation for three days following installation (all source assemblies), additional air mixing (paint combination), airing out of materials prior to installation (carpet and vinyl flooring assemblies), and room heating at 33° C subsequent to installation (all sources present together). The assemblies were installed following typical construction industry practice and concentrations of selected VOCs in chamber air were measured over the following two weeks. For each assembly, one or two experiments were performed using a base-case low ventilation rate scenario and two experiments were performed to evaluate the treatments. Two of the 13 experiments employed a combination of all three assemblies. One of these was extended for a period of three months to obtain information on the longer-term emission characteristics of the sources.

There were clear differences in VOC emissions among materials in each class. Therefore, the results demonstrated that there are opportunities to reduce exposures by selecting materials that emit lower amounts of toxic or odorous VOCs. A short period of additional ventilation following material installation generally increased the mass emissions of the compounds and also reduced the cumulative exposures for many compounds during the period of additional ventilation. After the period of additional ventilation, room concentrations were similar to concentrations in experiments without additional ventilation. This suggests that additional ventilation is likely to be a more effective treatment if it can be maintained for longer periods. Airing out carpet material for several days prior to installation effectively reduced the emissions of VOCs. After installing materials, applying heat to the chamber, in conjunction with additional ventilation, increased the emissions of VOCs during the heating period, but was relatively ineffective for reducing the subsequent concentrations and exposures for most compounds.

EXECUTIVE SUMMARY

BACKGROUND

Paints and other materials used to finish the interiors of buildings can emit volatile organic compounds (VOCs), including some toxic pollutants, exposing building occupants to the resulting emissions. The Air Resources Board (ARB) is required to consider such indoor exposures in assessing the risks to public health posed by toxic air contaminants (TACs), as required by California Health and Safety Code, Section 39660.5. The ARB provides information and guidance to the public regarding exposures to TACs, including exposures that occur indoors. In order to perform these assessments, it is necessary to identify the potential sources for the compounds of interest and determine the emission characteristics of these sources. This study was designed to generate data that is needed by ARB to perform these functions.

EXPERIMENTAL METHODS

The three general categories of interior finish materials selected for this study were interior latex paints, carpet and associated materials, and vinyl floor installation materials. First, the brand names of materials in each category that are widely used by California consumers were identified. Then, newly manufactured specimens of three or more materials in each major category were obtained for testing. Forty-five screening measurements were conducted with specimens of 24 primary materials. These measurements were conducted over 48 or 96 hours at standardized conditions in small-scale environmental chambers. The VOCs emitted by the materials were identified and chamber concentrations and specific emission rates for selected individual compounds and total VOCs (TVOC) were determined. Formaldehyde and acetaldehyde were also quantified.

In the second phase of the study, 13 large-scale experiments were conducted to characterize the emissions from realistic assemblies of the sources and evaluate the effectiveness of treatments that consumers might employ in their residences to reduce their exposures to VOCs. These experiments were performed in a chamber facility designed and operated to simulate a residential room environment. The walls and ceiling of a chamber compartment were painted gypsum board, the floor was carpeted or covered with sheet vinyl, and typical furnishings were installed. These surfaces mimicked typical "sink" effects that may substantially alter the impacts of emissions from indoor sources. Consequently, the net results produced by these experiments should be more realistic than those obtained in an all stainless-steel chamber with an abnormally low sink effect.

For each large-scale experiment, air samples for the analysis of VOCs and aldehydes were collected from the chamber throughout the first day following installation of the materials, then daily over the next nine days, with final samples taken on day 14. One experiment with combined source assemblies (carpet and vinyl flooring assemblies and paint) was extended for a total period of 90 days, with samples collected weekly.

The exposure reduction techniques that were investigated included: additional ventilation for three days following installation (all source assemblies); additional air mixing (paint); airing out of materials prior to installation (carpet and vinyl flooring assemblies); and room heating to 33° C following installation (combined assemblies). The results of the exposure reduction experiments were compared with those from base-case experiments (experiments with no exposure reduction actions) to quantify the effects of the treatments. The parameters evaluated were VOC concentrations, total VOC mass emissions, and potential cumulative exposures for full-time occupants.

RESULTS OF SCREENING MEASUREMENTS

The screening measurements generated a large amount of quantitative data on the emissions of VOCs, including 17 identified TACs. This data can be used by ARB in exposure models to estimate indoor exposures.

Twelve target compounds, including five TACs, were quantified for latex paints. The predominant VOC emissions from the conventional latex paints were a solvent component (typically ethylene glycol and propylene glycol) and the Texanol® coalescing aid. The emissions from two new generation, "non-VOC" paints did not contain glycol ethers. These paints also had much lower emission rates of SigmaVOC (*i.e.*, the sum of the quantified components) than the conventional paints.

Forty-six target compounds, including 13 TACs, were quantified for the carpet materials. All of the carpets emitted 4-phenylcyclohexene (4-PCH), an unwanted byproduct in the production of styrene-butadiene rubber latex. Styrene was detected in the emissions from three carpets. The emission rates of styrene were near detection limits, demonstrating a significant reduction relative to previously reported results. The two intermediate-grade nylon pile carpets emitted fewer VOCs and had lower emission rates of individual VOC and TVOC than the olefin carpets. The nylon carpets met the emissions guidelines of the Carpet and Rug Institute's (CRI) Indoor Air Quality Testing Program. Olefin carpets did not meet the CRI guidelines; however, the testing conditions were altered somewhat from the CRI procedures. All of the bonded urethane carpet cushions emitted butylated hydroxytoluene (BHT). The TVOC emission rate for the synthetic fiber cushion was substantially lower than the TVOC emission rates for the bonded urethane cushions.

Forty target compounds, including ten TACs, were quantified for the vinyl flooring materials. All of the sheet vinyls were a source of phenol, an identified TAC. The residential sheet vinyls with a clear "no-wax" top coat emitted more compounds and had higher emission rates of individual VOCs and TVOC than the single commercial sheet vinyl. The new-generation "solvent free" or "low VOC content" adhesive products were the source of a number of VOCs. No experiments were conducted with conventional adhesives.

RESULTS OF EXPOSURE REDUCTION EXPERIMENTS

In general, the use of additional ventilation at two air changes per hour for the first three days of an experiment decreased the chamber concentrations of many target VOCs during the treatment period, relative to the base-case experiments. Consequently, this treatment often produced beneficial effects with respect to cumulative exposures calculated for the first 48 hours after material installation. However, upon termination of additional ventilation, the chamber concentrations frequently returned to values similar to those measured in the base-case experiments. Thus, the beneficial effects of the treatment, with respect to potential exposures calculated for the remainder of the experimental period beginning 48 hours after material installation, were limited to specific compounds and were often relatively minor.

The large-scale experiments with paint produced the highest VOC concentrations. The dominant compounds were ethylene glycol and Texanol®. The initial concentrations of these compounds frequently ranged up to several tens of milligrams per cubic meter. The concentrations of the dominant VOCs were somewhat lower during the initial three-day period of additional ventilation, compared to the base-case experiments. Following the termination of additional ventilation, the concentrations in the treatment and base-case experiments were similar. The use of fans to increase air velocities at the painted surfaces, in combination with additional ventilation, did not result in large-magnitude reductions in air concentrations of the target VOCs, relative to the experiment with only additional ventilation.

The room concentrations of the target VOCs emitted by the carpet assembly were generally low when compared to the concentrations of VOCs emitted by the other source assemblies. The use of additional ventilation temporarily reduced the concentrations of many of the target VOCs emitted from the carpet. However, after the ventilation rate was reduced, the concentrations typically increased to values similar to those measured in the base-case experiment. One exception was the BHT emitted by the carpet cushion that reached slightly higher values in the treatment experiment with additional ventilation.

The vinyl flooring assembly emitted a large number of compounds. The compounds with the highest concentrations were tetrahydrofuran and cyclohexanone emitted by the seam sealer, toluene emitted by the sheet flooring adhesive, and n-tridecane and phenol emitted by the sheet vinyl flooring. The concentrations of tetrahydrofuran, cyclohexanone, and toluene, all volatile compounds, decreased rapidly over the first 24-48 hours of the experiments. Additional ventilation substantially decreased the concentrations of these compounds compared to the base-case experiment. Additional ventilation, however, had relatively small effects on the concentrations of the less volatile VOCs emitted by the assembly, such as phenol, TXIB® (a vinyl plasticizer), and benzothiazole.

Airing out materials for two days prior to their installation was effective for reducing the concentrations of VOCs emitted by the carpet assembly materials relative to the base-case experiment. This translated into reduced exposures for these constituents. However, the fractional reductions in exposures for two of the dominant compounds, 4-PCH from the carpet and BHT from the carpet cushion, beginning 48 hours after installation of the carpet, were relatively small. Airing out the sheet vinyl and the cove base had only a short-lived effect on the concentrations of the target VOCs or none at all.

Moderate in-situ heating, in combination with additional ventilation, increased the concentrations of many of the individual VOCs and TVOC emitted by the three combined source assemblies (carpet and vinyl flooring assemblies and paint). The effects were generally highest at the onset of heating and diminished with time over the 72-hour (72-h) heating period. However, the effects were largely limited to the actual heating period. Once heating was discontinued, the concentrations of many of the compounds quickly returned to values that were similar to those measured in the experiment with additional ventilation but no heating. Texanol®, one of the dominant compounds emitted by the latex paints, was an exception. Its longer-term concentrations decreased as a result of heating.

The long-term experiment was conducted at the base-case ventilation rate of 0.5 air changes per hour following a 72-h period of additional ventilation. The concentrations of a number of the dominant target VOCs and TVOC emitted by the three combined source assemblies remained relatively constant or decreased by less than a factor of three over the period of two to 12 weeks.

CONCLUSIONS

This is the first study to characterize VOC emissions from vinyl flooring assemblies and to obtain long-term measurements from the combined sources. This study generated a large amount of quantitative data on the emissions of VOCs, including TACs, from indoor sources commonly used by California consumers Additionally, the study quantified the effects of several exposure reduction techniques that homeowners or building managers might use to reduce the concentrations of VOCs and occupant exposures to VOCs following construction and/or remodeling of their homes or businesses.

The exposure reduction experiments demonstrated that there are some general practices homeowners or building managers can follow that may reduce VOC concentrations and decrease cumulative exposures to VOC emissions in their environments.

1) Materials that emit lower amounts of toxic or odorous VOCs should be selected whenever possible. This should lower occupant exposures and decrease the need for subsequent control strategies.

2) If possible, carpets and carpet cushions should be aired out in a well-ventilated, clean, dry environment for several days prior to their installation.

3) Very high, mechanically induced ventilation rates should be used during the application or installation of materials to protect the installers and any occupants that are present. This technique may also reduce subsequent occupant exposures.

4) Additional ventilation should be maintained for periods longer than three days to more effectively lower occupant exposures.

5) The amount of additional ventilation should be maximized. In many cases, the beneficial effects of ventilation, with respect to concentrations and exposures, are not in direct proportion to the increase in the ventilation rate.

6) The most effective way to reduce occupant exposures to the dominant VOCs emitted by latex paints is to delay occupancy for several days following painting.

7.0 EXPOSURE REDUCTION EXPERIMENTS WITH THE LATEX PAINT COMBINATION

7.1 EXPERIMENTAL TREATMENTS

Four large-scale experiments were conducted with the combination of latex paints consisting of materials LPS2, FLP3 and SGLP3. Two of these experiments, P-1 and P-2, were conducted at the base-case ventilation rate of 0.5 h^{-1} over 2 - 336 h. The results from these experiments were used to assess overall reproducibility of the methods and served as the basis for evaluating the efficacy of the two treatments. One of the treatment experiments, P-3, was conducted using additional ventilation for the first 72 h. The ventilation rate during painting and for the following two hours was 5 h^{-1}. From 2 - 72 h, the ventilation rate was 2 h^{-1}. The other treatment experiment, P-4, was conducted using the same ventilation conditions as Experiment P-3. In addition, air mixing at the surfaces of the painted gypsum panels was increased by the use of two oscillating room fans operated on their highest speed setting. Increased air velocities should have the effect of decreasing the effective thickness of the air boundary layer at the surface of the paint film that could accelerate the evaporation of the VOCs. This treatment was predicted to be most effective in combination with increased ventilation. The ventilation rate data and the compartment temperatures and relative humidities for the experiments are summarized in Appendix H, Table H-01. The ventilation rates and compartment temperatures were maintained within the established range limits. The relative humidity fell below the lower limit of 30 percent during portions of Experiments P-1 and P-2 (discussed below).

The paint application data for Experiments P-1 - P-4 is presented in Appendix H, Table H-02. Generally good uniformity in paint application was achieved as shown by the coverages in grams of wet paint applied per square meter of substrate surface area. The coverages for LPS2 ranged from 101 - 127 g m^{-2} with the lowest coverage for Experiment P-1. The coverages for the other three experiments were in a range of 118 - 127 g m^{-2}. The coverages for FLP3 in all four experiments were in a narrow range of 105 - 108 g m^{-2}. The coverages for SGLP3 in all four experiments were also in a narrow range of 100 - 105 g m^{-2}.

7.2 SELECTION OF THE TARGET COMPOUNDS

A qualitative analysis of the VOCs emitted by the paint combination in base-case Experiment P-2 identified ethylene glycol, propylene glycol and the two isomers of 2,2,4-trimethyl-1,3-pentanediol monoisobutyrate (Texanol®) as the most abundant compounds (Appendix H, Table H-03). There were several other oxidized compounds emitted at lower abundance. The six target VOCs selected for quantitative analysis in these experiments were: ethylene glycol; propylene glycol; n-buty ether; 2-ethyl-1-hexanol; 2-(2-butoxyethoxy)ethanol (di(ethylene glycol) butyl ether or DEGBE); and the combined Texanol® isomers (Appendix H, Table H-04). Hexylene glycol was not included as a target analyte because the calibration for this compound was unreliable. In addition, the aldehydes, formaldehyde and acetaldehyde, were sampled and analyzed in all four experiments. Formaldehyde, acetaldehyde, ethylene glycol and DEGBE are identified by the ARB as TACs.

7.3 CONCENTRATIONS OF THE TARGET COMPOUNDS

The concentrations of the six target VOCs in chamber compartment air and supply air during the four experiments with latex paints are presented in Appendix H, Tables H-05 - H-08. The concentrations for the duplicate VOC samples that were collected at several time points are given in these tables. It is noted that Experiment P-4 was terminated early at 240-h elapsed time because there was a two-day power outage following this sampling period in which the ventilation and data systems were off. The average concentrations of the six target VOCs in the supply air in all four experiments were below their lower limits of quantitation. The concentrations of these compounds in the background measurement periods were also at or below their lower limits of quantitation with the exception of Texanol® in Experiments P-3 and P-4. These were the second experiments to be conducted with paints in the compartments, and high ventilation rate flushing was incapable of reducing the background level of Texanol® to below its lower limit of quantitation.

The compartment concentrations of the dominant VOCs emitted in Experiments P-1 and P-2 were compared in order to assess the reproducibility of the methods. The concentrations of ethylene glycol in the four experiments are plotted in Figures 20a and 20b, and the concentrations of Texanol® are plotted in Figure 21. In these and the subsequent temporal plots, the data points are connected with dashed lines for the sole purpose of improving the readability of the plots. There were concentration differences at the beginning of Experiments P-1 and P-2 that were most notable for ethylene glycol. The cause, which is uncertain, may be related to the exact timing of sample collection with respect to the rapid temporal changes in concentrations immediately following painting. There were also relatively large temporal fluctuations in the concentrations of ethylene glycol in Experiment P-2 from approximately 120 h through the end of the experiment. Other than these obvious differences, there was generally good agreement between the two base-case experiments.

The environmental data for the experiments, summarized in Table H-01 shows that the relative humidity in Experiments P-1 and P-2 fluctuated over a relatively large range and fell below the lower target limit of 30 percent for some portion of the experiments. The compartment air relative humidity in Experiment P-2 is plotted in Figure 22. Figure 20b shows that there was a decrease in the ethylene glycol concentration at the 144- and 168-h sampling periods that corresponded with the period of the lowest relative humidity. This correspondence suggests that the water vapor concentration in air was either affecting the primary emission rate of ethylene glycol from the paints or may have had a secondary effect on the sorption and release of ethylene glycol by surfaces in the compartment. The concentration of propylene glycol may have been similarly affected. In Experiment P-1, the period of lowest relative humidity occurred between 240- and 336-h elapsed time when no air samples were taken. The screening measurements with the combination of paints LPS2 and FLP3 that were conducted at 30, 50 and 70 percent relative humidity demonstrated that the effect of water vapor concentration on the primary emission rates of VOCs, including ethylene glycol, from these paints was negligible or relatively minor (Appendix C, Tables C-51 - C-53). Therefore, it is possible that the effect of water vapor on the concentration of ethylene glycol in the large-scale experiments was primarily secondary and related to sorption/desorption phenomena.

The compartment relative humidity was within the target range and generally more stable during Experiment P-3. The supply air humidification system was added prior to initiating Experiment P-4. This system introduced water vapor into the supply air when the relative humidity of the supply air dropped below about 40 percent at room temperature. Thus, it was possible to maintain compartment relative humidity within the target range during the remainder of the experiments.

The compartment concentrations of the dominant VOCs in Experiment P-3 were compared to the corresponding concentrations in base-case Experiments P-1 and P-2 in order to assess whether there were any large-magnitude effects due to additional ventilation. Generally, the concentrations were lower in Experiment P-3 during the period of additional ventilation. However, the concentration differences were less than the four-fold difference in ventilation rate for this period. This suggests that the emission rates of these compounds increased at the higher ventilation rate perhaps due to mass transfer effects at the painted surfaces. Subsequent to 72-h elapsed time, the concentrations of both ethylene glycol and Texanol® were similar in all three experiments.

Prior to conducting Experiment P-4, air velocities were measured 5-cm above the surface at three locations (center of top half, approximate middle, and center of bottom half) for each of the five gypsum board panels with the two oscillating fans operating at their highest speed setting. The average air velocity was 54 ± 9 cm sec^{-1}. Velocities previously recorded 5-cm above the wall surfaces without the oscillating fans in the compartment were 20 ± 4 cm sec^{-1}. Thus, the added air mixing in Experiment P-4 resulted in about a factor of 2.5 increase in the air velocities near the painted surfaces. The added air mixing, however, did not result in any large-magnitude effect on the compartment air concentrations of the target VOCs as can be seen by comparing the concentrations of ethylene glycol and Texanol® for Experiments P-3 and P-4.

Since the samples were almost entirely dominated by a few compounds that were individually quantified, the concentrations for the total emissions of VOCs were quantified as SigmaVOC (Appendix H, Table H-09).

The concentrations of formaldehyde and acetaldehyde in compartment and supply air for Experiments P-1 - P-4 are presented in Appendix H, Tables H-10 and H-11, respectively. The background concentrations of these compounds were generally elevated over the supply air concentrations. This was presumably due to emissions from the wood frame and the plywood flooring of the chamber compartments. The chamber concentrations of formaldehyde during the experiments were only clearly elevated over background concentrations during the first day of sampling. The highest concentrations occurred during the first few hours of Experiments P-1 and P-2. The acetaldehyde concentrations substantially exceeded the formaldehyde concentrations. Clearly elevated concentrations of acetaldehyde occurred during the first six hours of sampling, with the highest concentrations occurring for base-case Experiments P-1 and P-2 (Figure 23). This difference may have been affected, in part, by the timing of the sample collection with respect to the occurrence of the peak compartment concentration of acetaldehyde. Nevertheless, the additional ventilation in Experiments P-3 and P-4 was apparently effective at removing the formaldehyde and acetaldehyde released during the painting procedure.

7.4 EMISSION RATES OF THE TARGET COMPOUNDS

Quasi steady-state emission rates of the target compounds in the four experiments were calculated with the mass-balance equation (Equation 1). Since the model assumes steady-state conditions and the compound concentrations, in many cases, were changing relatively rapidly during the first hours of the experiments, substantial uncertainty may have been introduced into the estimated emission rates for these beginning periods. The combined painted surface area of 16 m^2 was used in the calculations as there was no clear delineation of the sources of the dominant target compounds among the three paints.

The area-specific emission rates in milligrams of compound emitted per square meter of surface per hour (mg m^{-2} h^{-1}) are presented Appendix H, Tables H-12 - H-15 for Experiments P-1 - P-4, respectively. The area-specific emission rates of SigmaVOC are presented in Appendix H, Table H-16. An obvious difference among the experiments is that the emission rates of the dominant compounds were generally higher during the period of additional ventilation in Experiments P-3 and P-4 than during the same period of Experiments P-1 and P-2 (Figures 24a, 24b and 25). As discussed above, this was probably due to mass transfer effects at the painted surfaces. The estimated emission rates of ethylene glycol and Texanol® in the first hours following painting were clearly elevated in Experiments P-3 and P-4. However, as previously noted, there is substantial uncertainty in these estimates. A comparison of the emission rate results for Experiments P-3 and P-4 shows that there were no large magnitude effects due to increased air velocities at the painted surfaces.

The initial formaldehyde emission rates in Experiments P-1, P-3, and P-4 were similar, while the initial formaldehyde emission rate in Experiment P-2 was higher (Appendix H, Table H-17). The initial acetaldehyde emission rates were highest in base-case Experiments P-1 and P-2 (Appendix H, Table H-18).

7.5 CUMULATIVE MASSES AND EXPOSURES FOR THE TARGET COMPOUNDS

The results were first summarized by calculating the cumulative masses of the target compounds and SigmaVOC that were emitted over the experimental period (Appendix H, Table H-19). Since Experiment P-4 was terminated early at 240-h elapsed time, cumulative masses were determined for the 0- to 240-h period for all four experiments and for the 0- to 336-h period for Experiments P-1, P-2, and P-3. Deletion of the final four-day period did not have any effect on the relative differences among Experiments P-1, P-2, and P-3 for any of the target compounds.

The compounds with the distinctly highest cumulative mass emissions were ethylene glycol, propylene glycol and Texanol®. Additional ventilation and additional ventilation with air mixing in Experiments P-3 and P-4 resulted in higher mass emissions of these dominant compounds. The data indicates that the mass emissions of acetaldehyde decreased with the two treatments. As previously discussed, this was probably an artifact caused by the timing of sample collection with respect to the rapid removal of acetaldehyde from the compartment. The relative magnitudes of the effects of the treatments on the cumulative mass emissions of the target compounds and SigmaVOC over - 240 h are illustrated in Figure 26. For this figure, the results for base-case Experiments P-1 and P-2 were averaged and then used to calculate the ratios for the two treatment experiments. For SigmaVOC and all of the compounds, except acetaldehyde, n-butyl ether and 2-ethyl-1-hexanol, the cumulative mass emissions were distinctly higher in the two treatment Experiments P-3 and P-4 than in the base-case experiments. The effects on cumulative mass emissions due to the added air mixing in Experiment P-4 relative to Experiment P-3 were most apparent for ethylene glycol and propylene glycol. The differences between these two experiments for the other compounds were minor.

The fractional compositions of ethylene glycol and Texanol® in paints LPS2, FLP3 and SGLP3 were determined by analysis of the bulk paints (Appendix C, Table C-58). The masses of ethylene glycol and Texanol® that were used in Experiments P-1 - P-4 were calculated from the paint application data and the paint compositions. These values are presented in Table 10 where they are compared to the cumulative masses of ethylene glycol and Texanol® emitted during the experiments. The average mass of ethylene glycol used in the four experiments was approximately 100 g, and the average mass of Texanol® was approximately 43 g. The cumulative mass emissions of ethylene glycol were 3.7 - 13.9 g over 0 - 240 h and 4.1 - 14.2 g over 0 - 336 h. Thus, only approximately 4 - 14 percent of the ethylene glycol that was applied with the paints was emitted over the 336-h period. The cumulative mass emissions of Texanol® were 6.9 - 13.2 g over 0 - 240 h and 8.6 - 15.0 g over 0 - 336 h. Only 19 - 35 percent of the applied Texanol® was emitted over the 336-h period. The results demonstrate the very large sorption losses and the slow re-emission of the major volatile organic constituents of latex paints applied to gypsum board. These results are excellent agreement with the results obtained in a small-scale chamber with another flat latex paint (Chang *et al.*, 1997). In that study, nine percent of the ethylene glycol and 29 percent of the Texanol® in the paint applied to gypsum board were emitted over the same 336-h time period. This similarity, despite the differences in the paint and the experimental apparatus and conditions, demonstrates that the gypsum board substrate plays a significant role in determining the emissions of VOCs from latex paint. At present, it is not known whether 100 percent of the ethylene glycol and Texanol® absorbed by gypsum board are re-emittable (Chang *et al.*, 1998).

The experiments and the treatment effects were next compared by examining the peak exposures to the target compounds that a residential occupant might receive at these conditions. The highest exposure concentrations (ppb) of the target compounds were measured shortly after paint application (Appendix H, Table H-20). The maximum concentrations of formaldehyde, acetaldehyde, n-butyl ether and 2-ethyl-1-hexanol were substantially lower in Experiments P-3 and P-4 with additional ventilation relative to base-case Experiments P-1 and P-2. For Acetaldehyde, there was an approximate ten-fold difference in maximum concentration. The maximum concentrations of ethylene glycol and propylene glycol in Experiment P-4 with additional ventilation combined with air mixing were about 60 percent of the respective maximum concentrations of these compounds in Experiment P-3 with additional ventilation only.

Finally, the experiments and the treatments were compared based on theoretical cumulative exposures in ppm-h for a residential occupant that were calculated for two different exposure periods.

The estimated cumulative exposures to the target compounds for the first 48 hours of the experiments are presented in Appendix H, Table H-21. For this calculation, occupancy began at time zero, the conclusion of paint application, and the occupancy factor was assumed to be 0.83 (*i.e.*, an occupancy of 20 hours per day averaged throughout the day). The cumulative exposures to formaldehyde, acetaldehyde, n-butyl ether and 2-ethyl-1-hexanol for this period were clearly lower in Experiments P-3 and P-4 with additional ventilation relative to the base-case experiments. The differences between the cumulative exposures for the two treatment Experiments P-3 and P-4 were all less than 25 percent. The relative magnitudes of the effects of the treatments on the cumulative exposures to the target compounds over 0 - 48 h are illustrated in Figure 27. The results for base-case Experiments P-1 and P-2 were averaged and used to calculate the ratios for the two treatment experiments. This figure shows that the treatments did not result in large fractional reductions in the exposures to the dominant compounds, ethylene glycol, propylene glycol and Texanol®, for this initial two-day period.

Table 10. Applied masses (g) of ethylene glycol and Texanol® compared to the masses of these compounds emitted over 0 -336 h in Experiments P-1 - P-4. The applied masses were calculated from the paint application data (Appendix H, Table H-02) and the paint compositions (Appendix C, Table C-58).

Compound / Parameter	Exp P-1	Exp P-2	Exp P-3	Exp P-4
Ethylene glycol				
Applied mass (g)	90	103	100	104
Emitted mass (g)	4.08	6.8	14.2	10.0*
Fraction emitted (%)	4.5	6.6	14	9.6
Texanol®				
Applied mass (g)	39	45	43	45
Emitted mass (g)	8.6	8.6	15.0	11.8*
Fraction emitted (%)	22	19	35	26

*Masses were emitted over 0 - 240 h in Experiment P-4.

The estimated cumulative exposures to the target compounds for the remainders of the experiments are presented in Appendix H, Table H-22. For this calculation, occupancy began exactly 48 h after painting, thus avoiding the initial period of highest concentration. It was assumed that the daily duration of occupancy was 20 h. The compounds with the distinctly highest cumulative exposures in all of the experiments were ethylene glycol, propylene glycol and Texanol®. The treatment effects were most pronounced for the minor paint constituents. The most obvious difference was the reduction in the exposures to acetaldehyde in the two treatment experiments. Additional ventilation and air mixing decreased the cumulative exposure to n-butyl ether, and both additional ventilation and additional ventilation with air mixing decreased the exposure to 2-ethyl-1-hexanol.

The relative magnitudes of the effects of the treatments on the cumulative exposures to the target VOCs over 48 - 240 h are illustrated in Figure 28. The results for base-case Experiments P-1 and P-2 were averaged and used to calculate the ratios for the two treatment experiments. The figure shows that additional ventilation by itself did not result in reduced exposures to the dominant VOCs for this period. There were, however, approximate 25 percent reductions in the exposures to ethylene glycol and Texanol® in Experiment P-4 with additional ventilation combined with air mixing relative to the base-case experiments.

Figure 29 compares the magnitudes of the cumulative exposures estimated for the 0- to 48-h periods to the total cumulative exposures over 0 - 240 h that were calculated as the sums of the exposures for the two periods. For all compounds except Texanol®, the cumulative exposures estimated for the 0- 48-h periods of the experiments accounted for about one-half or more of the total cumulative exposures. The exposures to Texanol®, the least volatile compound, during the 0- 48-h periods were about 30 percent of the total exposures.

7.6 COMPARISON WITH THE SCREENING MEASUREMENT RESULTS

Latex Primer Sealer LPS2 and Flat Latex Paint FLP3 accounted for approximately 97 percent of the wet mass of paint applied in each of the four large-scale experiments. The average combined coverage of these two paints was 224 g m^{-2}. Three screening measurements were conducted with a combination of the LPS2 and FLP3 paints over a range of 30 - 70 percent relative humidity. The average combined coverage of the two paints in these experiments was 169 g m^{-2} or about 75 percent of the combined coverage of the two paints in the large-scale experiments. Emission rates of the target compounds and SigmaVOC in the small chambers were calculated for elapsed times of 48 and 96 h (Appendix C, Tables C-51 - C-53).

The 96-h emission rates (mg m^{-2} h^{-1}) of ethylene glycol, propylene glycol, DEGBE, Texanol®, and SigmaVOC in the three screening measurements and in the four large-scale experiments are compared in Table 11. Generally, the results agreed within about a factor of two. The emission rates of ethylene glycol were roughly comparable while the Texanol® emission rates were about a factor of two higher in the screening measurements. These discrepancies are relatively small considering that there were large differences between these experiments with respect to chamber ventilation rates, chamber surface-to-volume ratios, and the types and amounts of surface materials.

Table 11. Area-specific emission rates (mg m^{-2} h^{-1}) of ethylene glycol, propylene glycol, DEGBE, Texanol® and SigmaVOC at 96-h elapsed time in the three screening measurements with the LPS2 and FLP3 paint combination and in large-scale Experiments P-1 - P-4.

	Specific Emission Rate, mg m^{-2} h^{-1}			
	Screening Measurements Combined LPS2 & FLP3		**Large-Scale Expts. P-1 - P-4**	
Component	**Avg.**	**Range**	**Avg.**	**Range**
Ethylene glycol	0.36	0.20 - 0.57	0.54	0.46 - 0.59
Propylene glycol	<0.06	—	0.09	0.07 - 0.13
DEGBE	<0.03	—	0.01	---
Texanol®	3.24	2.68 - 3.83	1.60	1.12 - 1.92
SigmaVOC	3.65	3.02 - 4.09	2.23	1.67 - 2.57

Novel approach to formulation modelling

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Formulation optimisation is one of the more important steps in the development of surface coating systems. Several commercially available computer software packages that can be used to assist the formulation optimisation have been developed, provided that sufficient data are available. For systems having complex behaviour, more flexible techniques are needed. The approach that forms the basis of this paper is based on spline interpolations. Thus, the more complex behaviour of coating systems can be simulated and interpreted. The efficiency and the reliability of the models that have been developed have been evaluated using data that are relevant to anticorrosion coating systems.

When developing commercially viable surface coating formulations, it is often necessary to take several properties of the coating formulations into consideration. For instance, when developing an anticorrosion coating, the barrier properties and the flexibility of the coating systems and the adhesion of the coating to the substrate, usually need to be optimised. There are several computer-aided software packages now commercially available to facilitate such optimisation [1–2]. Most of these software packages employ existing statistical, analytical methods and/or neuro-network principles. As such, most of these software packages perform well when used to optimise the compositions of coating systems having relatively simple property-of-interest/composition relationship. However, often there are coating systems that have a relatively complicated property-of-interest/composition relationship. In such cases, more effective approaches to modelling are required. *Guthrie and Lin* [3] developed a novel approach to experimental design and to formulation modelling that was based on the spline interpolation technique. Such an approach has proven to be particularly effective when modelling complex mixture systems [4–7]. In this paper is reported the application of such mathematical modelling approach to the development of anticorrosive coating systems. The basis to this modelling approach is given below. This is then followed by application of the approach to the development of effective anticorrosion formulations.

Modelling based on spline-interpolation

Establishment of mathematical models that reliably represent the relationship, between the properties/performance and the composition of the coating systems, is essential to the optimisation of surface coating formulations. A general form of such mathematical model is given as *Equation 1* below.

$$Y_i = f_i(X_1, X_2, \ldots, X_n) \qquad \textit{Equation 1}$$

Here, Y_i $(i = 1, 2, \ldots, m)$ denotes the properties of the coating system, m being the total number of property-of-interest. As indicated by *Equation 1*, such properties are dependent only on the composition (in terms of percentage or fraction) of the coating system, i.e. X_j $(j = 1, 2, \ldots, n)$, n being the total number of the components in the coating system. Clearly, the sum of the X's is always 100% in terms of percentage or 1 in terms of fraction.

Several models based on single polynomial interpolation have been widely used in modelling mixture systems. Some of these models are given as *Equations 2–7*.

Model 1: $Y = a_0 + \ldots + a_i X_i$ *Equation 2*

Model 2: $Y = a_i X_i + \ldots + a_{ij} X_i X_j$ *Equation 3*

Model 3:
$Y = a_0 + \ldots a_i X_i + \ldots + a_{ij} X_i X_j$ *Equation 4*

Model 4:
$Y = a_i X_i + \ldots + a_{ij} X_i X_j + \ldots + a_{ijk} X_i X_j X_k$
Equation 5

Model 5:
$Y = a_0 + \ldots + a_i X_i + \ldots + a_{ij} X_i X_j + \ldots a_{ijk} X_i X_j X_k$
Equation 6

Model 6:
$Y = a_0 + \ldots + a_i X_i + \ldots + a_{ij} X_j^2 + \ldots + a_{ij} X_i X_j + \ldots$
$+ a_{ijk} X_i X_j X_k$ *Equation 7*

where a_0, a_i, a_{ij} and a_{ijk} are constants that are dependent on the characteristics of individual mixture systems; $i, j, k = 1, 2, \ldots, n$ correspond to components 1, 2,..., n. The best model, in terms of both the convenience of data handling and the accuracy of the approximation, is Model 4. For two component mixture systems, this model can be expressed as,

$$Y = a_1 X_1 + a_2 X_2 + a_{12} X_1 X_2 \qquad \textit{Equation 8}$$

Here, we have three constants, a_1, a_2 and a_{12}, representing the characteristics of an individual mixture system. It should be emphasised that all of the above models assume that the property developed is not dependent on the sequence of mixing of the components.

Most of the conventional single polynomial models, i.e. Models 1–6, can be used to simulate satisfactorily the relationship between performance/property-of-interest and the composition of surface coating systems having simple behavioural features, such as those shown in *Figure 1*. However, most of the conventional single polynomial models are unable to simulate the complex relationship between the properties-of-interest and the composition of the mixture, such as those represented in *Figure 2*. In both *Figures 1* and *2*, the vertical-axis represents the property-of-interest while the other axes represent the coating compositions.

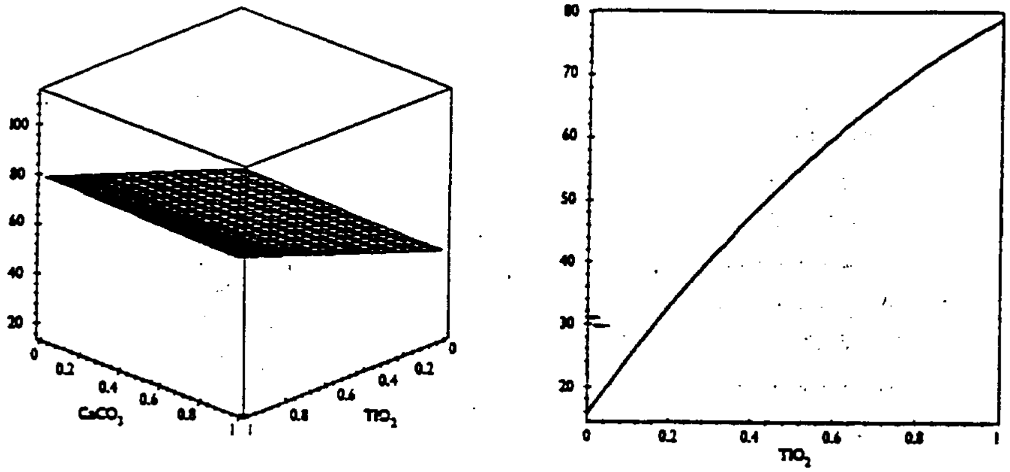


Figure 1: Typical simplistic property of interest/composition relationship

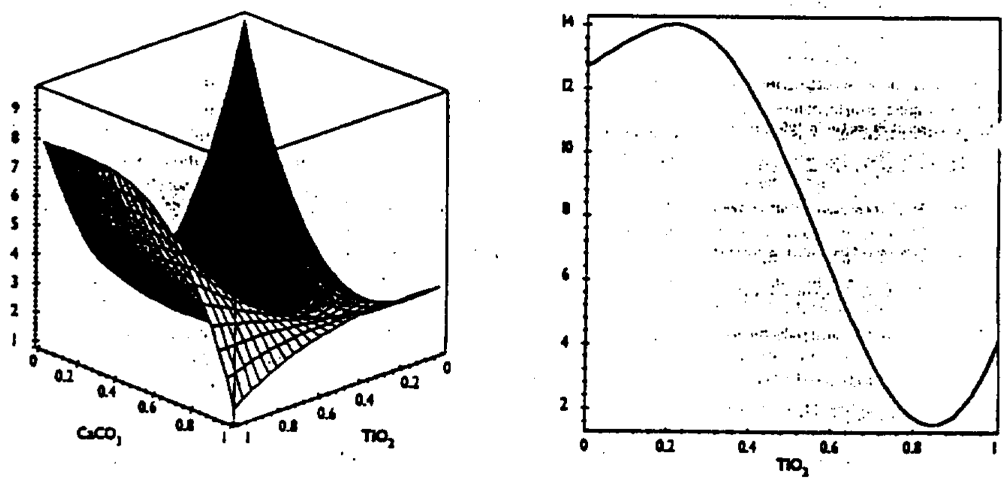


Figure 2: Typical complex property of interest/compositon relationship

Thus, our interests lie in the application of *piecewise* polynomials as a universal model for the simulation of the property-of-interest curve/surface/space of surface coating systems. Such *piecewise* polynomial model should possess continuity and flexibility over the entire composition range, i.e. from $X_i = 0$ (or 0%) to $X_i = 1$ (or 100%), $i = 1, 2, \ldots, n$, cubic spline interpolation being the one that is more suitable.

The adaptation of the concept of cubic spline interpolation to the simulation of a property-of-interest curve is given as follows. Taking into account N measurements for a two component mixture, where $X_2 = 1 - X_1$, the mathematical representation of the property-of-interest curve is given as

$$Y \cap Y_i(1) = a_{i(1)} + b_{i(1)}(X_1 - X_{i(1)}) + c_{i(1)}(X_1 - X_{i(1)})^2 + d_{i(1)}(X_1 - X_{i(1)})^3 \qquad \text{Equation 9}$$

where $i = 1, 2, \ldots, N-1$. Given any number of measurements, as required by the precision needed to represent the property-of-interest data, a set of splines, interpolating the property of interest curve, can be established. A spline simulation of the property-of-interest space of a p-component coating system, taking into account of $(N_1+1)(N_2+1)\ldots(N_p+1)$ measurements, can be given as

$$Y \cap Y_{i(1)} \times Y_{i(2)} \times \ldots \times Y_{i(p-1)} \qquad \text{Equation 10}$$

while,

$$Y_{i(1)} = a_{i(1)} + B_{i(1)}(X_1 - X_{i(1)}) + c_{i(1)}(X_1 - X_{i(1)})^2 + d_{i(1)}(X_1 - X_{i(1)})^3. \qquad \text{Equation 11}$$

$$Y_{i(2)} = a_{i(2)} + b_{i(2)}(X_2 - X_{i(2)}) + c_{i(2)}(X_2 - X_{i(2)})^2 + d_{i(2)}(X_2 - X_{i(2)})^3. \qquad \text{Equation 12}$$

and so on to

$$Y_{i(p-1)} = a_{i(p-1)} + b_{i(p-1)}(X_{p-1} - X_{i(p-1)}) + c_{i(p-1)}(X_{p-1} - X_{i(p-1)})^2 + d_{i(p-1)}(X_{p-1} - X_{i(p-1)})^3. \qquad \text{Equution 13}$$

where, $i_{(1)} = 1, 2, \ldots, N_1$; $i_{(2)} = 1, 2, \ldots, N_2$; ...

LIFELINES

- A chartered chemist, Dr. Long Lin is currently a Field Group Lecturer in the Department of Colour Chemistry at University of Leeds, where he supervises a very active Polymer and Surface Coating Science and Technology Research Group. He has over fifteen years of experience in surface coating science and technology, particularly in experimental design and data interpretation. Dr. Lin is also an active member of the Oil and Colour Chemists' Association. He is a member of the Technical Policy's Committee, the Publication's Committee and the Special Publication's Committee of OCCA.
- Prof. James Thomas Guthrie is Field Group Professor of Polymer and Surface Coatings Science, Department of Colour Chemistry at University of Leeds. He started his career as Research and Development Chemist at Transparent Paper Ltd in 1960, where he worked for eight years. In 1971 he gained his PhD from Salford. Since 1972 he has held different positions with the University of Leeds. His research interests include copolymers, composites and blends, functional polymeric agents, novel printing methods, radiation and UV curing, plastics coloration, surface characterisation and modification, dispersion stabilisation and characterisation, anticorrosion coating systems, and polymers from renewable sources.
- Dr. Weidong O. He is currently a research fellow in the Department of Colour Chemistry at Leeds University. She has many years of experience in organic synthesis, in polymer chemistry and in surface coating formulations. Dr. He has a number of patents on synthetic colorants, polymeric materials and on surface coating formulations.

$= 1, 2, \ldots, N_{p-1}$; $N_1, N_2, \ldots, N_{p-1}$ represent the number of coating formulations containing a different fraction of component $1, 2, \ldots, p-1$. Terms in *Y* and *X* have the same meanings as defined previously. The evaluation of the coefficients of these splines is no more difficult than that which pertains to the case of two component mixtures.

Anticorrosive coating systems

The major coating property of concern in this study was that of anticorrosion. Anticorrosion properties are dependent on a number of other properties such as the barrier properties, the mechanical properties and the ageing properties. Thus, anticorrosion properties are demonstrated through the coating's ability to resist corrosive environments such as moisture, salt water, electrolytes, extreme temperatures, organic solvents, micro-organisms and mechanical strain.

The barrier properties of a coating are mainly attributed to the degree of crosslinking of the film-formers. In this sense, a completely impermeable coating would be ideal for anticorrosion purposes. However, in reality, such coatings would normally have poor mechanical properties such as poor flexibility and brittleness. Thus, one of the coating developer's tasks is to achieve a balance between the coating's impermeability to invasive substances and the coating's mechanical properties.

The mechanical performance of coatings is demonstrated through the coating's hardness and the coating's flexibility. While coating hardness is dependent on the degree of crosslinkage of the polymeric chains, the coating flexibility is closely related to the intrinsic characteristics of individual polymer chains. Since the process of substrate corrosion starts with the penetration of the invasive medium through the coating layer, any pits or cracks in the coating layer would reduce the anticorrosion properties of the coating layer. Therefore, the coating hardness and the coating flexibility need to be adequate to ensure a long service life.

Development of a complete coating system involves several stages. Coating development usually starts with the synthesis of the core-resin precursors. This is followed by blending the core-resin precursors with pigments and assistant polymeric species to give a complete coating system. The composition of the final coating formulation determines the performance of the coating. Optimisation of coating formulation is inevitable for the development of coating systems, especially of novel coating systems.

Materials and equipment

A complete anticorrosion coating formulation typically consists of at least one core resin precursor, one assistance resin precursor and one pigment. In this study, a previously developed porphyrinogenic polymer was used as the core resin precursor. For details of the porphyrinogenic polymer, please refer to PhD thesis by *W. He* [8] and *US patent US05360884* [9]. A UCB "Ebecryl 600" epoxy resin precursor (supplied by UCB Chemical Sector, Speciality Chemicals Division, Drogenbos, Belgium) and "XH943" aliphatic polyamide resin precursor (supplied by Ciba Specialties, Duxford, Cambridge, UK) were used as the assistant resin precursors. Various pigments were used though the major emphasis was placed on the iron oxides. Two types of iron oxides were employed, namely the red oxide and the yellow oxide both of which were provided by the Kalon Group Plc., Birstall, U.K. Galvanised steel sheets (50 mm × 100 mm), supplied by Ford Motor Company, Dagenham, were used in preparation of test panels for the study reported here.

Experimental procedures

In order to optimise the anticorrosive properties of the porphyrinogenic coating system. Coating formulations containing porphyrinogenic resin precursor (40%, w/w), "Ebecryl 600" resin precursor (25%, w/w), Ciba Specialties "XH 943" (8%, w/w), butanol (8%, w/w), FeO + Fe_2O_3 (17%, w/w) (FeO/ Fe_2O_3 ratio varied) and other additives (2%) were prepared. In this paper is reported only the processes involved in optimisation of the ratio of FeO to Fe_2O_3, the total amount of FeO and Fe_2O_3 and the amount of other coating ingredients being unchanged, as given above.

The coating formulations, containing various amounts of FeO and Fe_2O_3, were applied onto galvanised steel test panels and cured, in a thermal oven, at 260 °C for 60 seconds. The dry coating film thickness was 25 µm in all cases. The cured, coated panels were subjected to various laboratory tests. The coating formulations and the test procedure are detailed as follows.

Preparation of coating formulations for the optimisation of the pigment contents

Various experiments were designed and conducted in order to provide data for the optimisation of the ratio of FeO to Fe_2O_3 in the paint formulations. In this investigation, the emphasis has been on the optimisation of the ratio of two major pigments used in the anticorrosion coating formulations. As such, the ratio of the total amount of iron oxides to the total amount of other coating ingredients was deliberately kept constant, i.e. 17% (w/w) of the total coating formulation. The ratio of FeO to Fe_2O_3 was varied to give a series of coating formulations. A total of seven coating formulations were designed and prepared. The compositions of these coating systems, in terms of the FeO/Fe_2O_3 ratio are given in *Table 1*.

Test procedures

As mentioned above, several mechanical properties of coating film are related to anticorrosion performance of the coating film. These mechanical properties of interest are the hardness of the coating film, the flexibility of the coating film and the adhesion of the coating film to metallic substrate. These mechanical properties, together with the anticorrosion properties, i.e. the coating's resistance to a simulated marine corrosion environment and the coating's resistance to organic solvents, of the various coating systems were acquired experimentally. Test procedures for the acquisition of each of these properties are briefly described as follows.

Hardness test procedure - scratch resistance test

A scratch resistance test was used, in this study, to evaluate the hardness of the coatings. A pencil hardness tester is the most widely used instrument for the evaluation of coating hardness [10]. However, to conform to the specific requirements associated with this study, a standard metal probe was used in the measurement of coating hardness. The edge of the probe was drawn across the coating surface with consistent force. The coating was considered to have failed the hardness test when the whole or a part of the coating was removed.

Table 1: Composition ratio of FeO/Fe_2O_3 in coating samples prepared for the optimisation of FeO/Fe_2O_3 content

	Ratio	
Sample code	FeO	Fe_2O_3
1	100	0
2	75	25
3	66.6	33.4
4	50	50
5	33.4	66.6
6	25	75
7	0	100

T-bend test procedure

One of the important properties of a coating is the degree of adhesion of the coating to the substrate surface. Good adhesion contributes significantly to good anticorrosion properties. In this study, the degree of coating adhesion to the substrate surface was evaluated using T-bend tests adapted from American Standard of Test Methods, D522-93a [11].

MEK dry rub test procedure - solvent resistance test

The solvent resistance test was designed to evaluate the coating's resistance to organic solvents. In some cases, the solvent resistance tests were used to evaluate the completeness of curing, since uncured resin precursors more easily dissolve in the solvents. The procedure of solvent resistance assessment was adapted from American Standard of Test Methods:D5042-93 [12].

Salt spray test procedure

Saline resistance is one of the major anticorrosive properties. All the salt spray tests were carried out using a salt-spray unit in Materials Laboratory 13/100, Research & Engineering Centre, Ford Motor Company Limited, Laindon, Basildon, Essex, U.K. The salt spray corrosion test cabinet conditions conformed to the ASTM B117. The Ford Laboratory Test Method FLTM EU BI 103-1 was used throughout the tests.

Models based on spline interpolation give much improved simulation

The hardness (scratch resistance test), the flexibility (T-bend test) and the solvent resistance (MEK dry rub) of the cured coating samples were characterised using the procedures described above. The results, together with the relevant normalised values (details following), are detailed in *Table 2*.

The results shown in the "Observation" columns in *Table 2* were subjected to analysis using the "Expert" computer software [4]. The "expert" package is capable of simulating the experimental data using the conventional single polynomial models and the step-wise, multiple spline interpolation models. Since the computation programme requires that each property be represented as a numerical value, the observed coating hardness values were converted into numerical values. For the convenience of numerical processing, all result servations were converted into fractio values between 0.0 and 1.0. For instance, the expected coating performance, in terms of the solvent resistance, was 50 MEK double rubs. Therefore, the 50 times of MEK double rub was set at the value of 1.0. Consequently, the MEK double rub property of the coating sample No. 2, which resisted 30 MEK double rubs was considered to be 0.6, i.e. $\frac{30}{50}=0.6$, in a 0~1 scale. The settings for the hardness were standardised as good = 1.0; fair = 0.66; intermediate = 0.33; and poor = 0.0. Similarly, the settings for the coating adhesion properties were 0T = 1.0; 2T = 0.5; and 4T = 0.0 and so on.

The normalised/standardised values of the coating properties were then input to the computation programme, "Expert", with which mathematical simulations were generated for each of the properties-of-interest, i.e. the coating's hardness, the coating's flexibility and the coating's solvent resistance. The relationships between the coating's properties-of-interest and the FeO/Fe_2O_3 composition are shown as *Figures 3~5*. The solid square symbols, in *Figures 3~5*, represent the normalised, average observation values. The dashed curves represent the simulation of the experimental data using a single polynomial mode' solid curves represent the simulation/p tions by spline-based models.

Table 2: The properties of the cured coatings

	Hardness		T-bend		MEK dry rub	
Sample code	Observation	Normalised value	Observation	Normalised value	Observation (D.R. times)	Normalised value
1	Good	1	2T-3T	0.375	30	0.6
2	Good	1	2T	0.5	30	0.6
3	Poor	0	4T	0	20	0.4
4	Good	1	3T	0.25	30	0.6
5	Fair	0.33	3T	0.25	30	0.6
6	Fair	0.33	2T	0.5	20	0.4
7"	Poor	0	4T	0	20	0.4

It can be seen, from *Figures 3–5*, that models based on spline interpolation give much improved simulation of the experimental data in all cases, compared to the models based on a single polynomial. Indeed, models based on single polynomial gave very poor simulation of the experimental data, coefficients of regression being 0.6522 (hardness), 0.3730 (flexibility) and 0.5586 (solvent resistance), respectively.

Reliability of the prediction by the model based on spline interpolation is confirmed

This software further predicted the compositions of FeO/Fe_2O_3 in the coating formulations that would give the optimal hardness, the optimal adhesion and the optimal solvent resistance. These were 86% FeO/14% Fe_2O_3 for optimal hardness, 86% FeO/14% Fe_2O_3 for optimal adhesion (T-bend) and 86% FeO/14% Fe_2O_3 for optimal solvent resistance, total amount of FeO/Fe_2O_3 being 17% of the total coating formulation *(Figure 6)*.

In order to verify the reliability of such prediction, a coating formulation containing FeO and Fe_2O_3 to the *ratio* 86% to 14% (the total amount of FeO/Fe_2O_3 constituting 17% of the total coating formulation) was prepared. This coating formulation was coated onto galvanised steel panels and cured in a preheated oven, at 260 °C for one minute. This coating sample is denoted as *Sample 8*. The coating properties were measured as hardness = Excellent, T-bend = 0T and MEK dry rub = 35. These values agree very well with the predicted optimum values as indicated in *Figure 6*.

Galvanised test panels, coated with the coating formulations containing various amount of FeO and of Fe_2O_3, i.e. Samples 1–8 (see *Table 2* and the paragraph immediately above), were subjected to salt spray tests. The results of these salt-spray tests, in terms of the presence of white corrosion product, blisters, coating detachment etc., at 100 hours, 192 hours, 480 hours and 600 hours, respectively, were recorded.

The average diameter of the blisters on the coating observed, for each test panel, at various stages of the salt spray test, is recorded in *Table 3*. The same data are graphically presented in *Figure 7*.

It can be seen, from both *Table 3* and *Figure 7*, that *Sample 8*, i.e. coating formulation containing the predicted optimal quantity of FeO/Fe_2O_3, gave the best anticorrosion per-

Figure 3: **Modelling of hardness/compositi on relationship using single polynomial and spline interpolation**

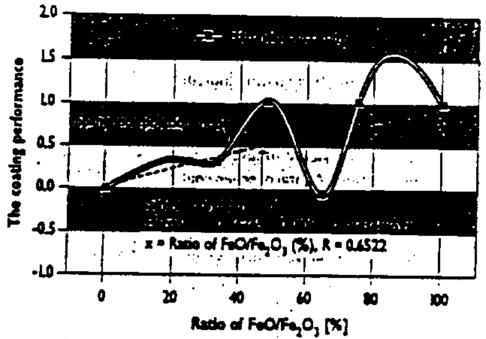


Figure 4: **Modelling of flexibility/compositi on relationship using single polynomial and spline interpolation**

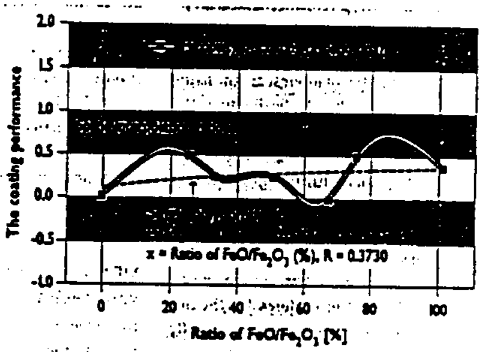


Figure 5: **Modelling of solvent resistance/ composition relationship using single polynomial and spline interpolation**

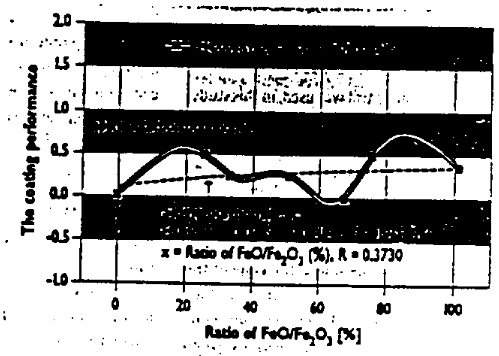
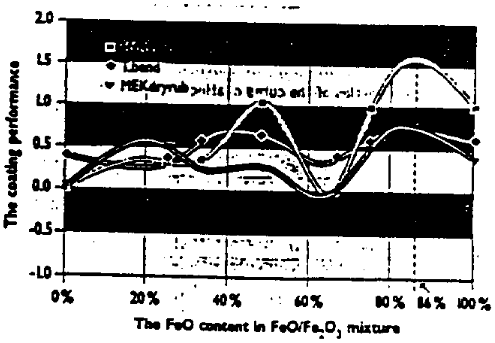


Figure 6: **The prediction of optimum FeO/Fe_2O_3 composition**



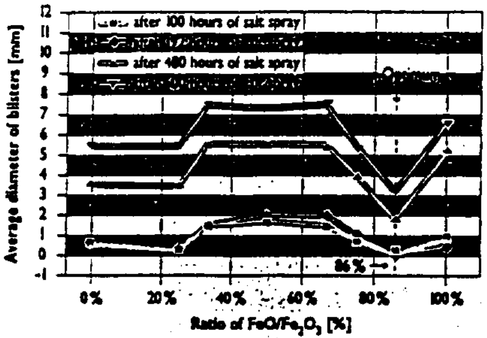


Figure 7: Results of salt spray test

Table 3: Average diameter of blisters on coating tested by salt spray

		Average diameter of blisters on coating (mm)			
Sample code	Length of salt spray test (hr.) FeO/Fe$_2$O$_3$ (%)	100	192	480	600
7	0	0.5	0.5	3.5	5.5
6	25	0.3	0.3	3.5	5.5
5	33.3	1.5	1.5	5.5	7.5
4	50	1.75	2	5.5	7.35
3	66.6	1.5	2	5.5	7.5
2	75	0.75	1	4	5.5
8	86	0	0	1.75	3.25
1	100	0.5	0.5	5	6.5

formance. This indicates that 86%:14% (FeO/Fe$_2$O$_3$) was the optimal composition. Thus, the reliability of the prediction by the model based on spline interpolation was confirmed.

It was therefore clear that an optimal porphyrinogenic anticorrosion coating formulation would consist of 40% of porphyrinogenic resin precursor, 25% of "Ebecryl 600", 8% of "XH943", 8% butanol, 14.62% FeO, 2.38% Fe$_2$O$_3$ and 2% other additives.

Efficient optimisation of surface coatings formulations

It can be concluded from the above that the model based on spline interpolation provides a unique, efficient solution to the modelling of the properties-of-interest/compositions relationship of coating systems showing complicated behaviour. Indeed, using such model, a high degree of simulation of the experimental data can be achieved, thus allowing efficient optimisation of surface coatings formulations. ■

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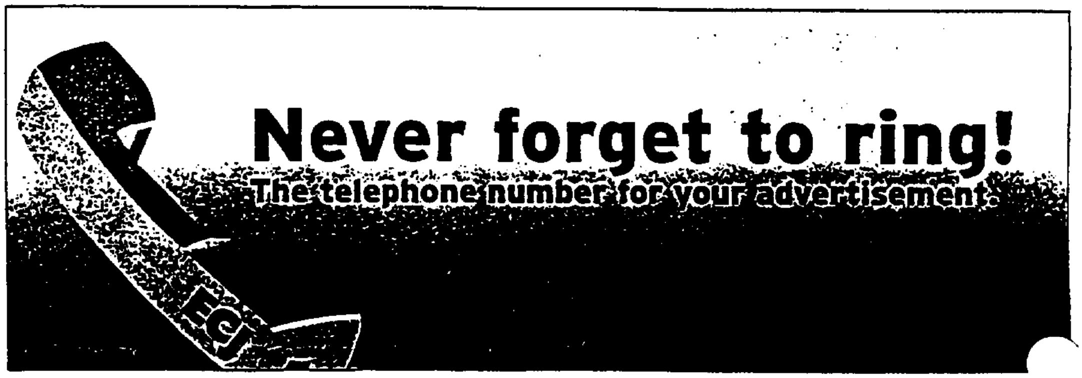

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

April 7, 2000

Mr. Dean C. Simeroth, Chief
Criteria Pollutants Branch
Stationary Source Division
Air Resources Board
2020 L Street
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Dear Mr. Simeroth:

Multi-Agency Comments on the Suggested Control Measure for Architectural Coatings

This correspondence represents the collective comments of three public agencies to the Air Resources Board (ARB) on the February 11, 2000 Draft Program Environmental Impact Report (EIR) for the Suggested Control Measure for Architectural Coatings (SCM). The three major California public agencies represented are The Metropolitan Water District of Southern California (MWD), the California Department of Water Resources (DWR), and the California Department of Transportation (Caltrans). MWD and DWR provide water for municipal and industrial use (approximately 1.8 and 3.0 million acre-feet of water per year, respectively) and operate extensive systems of water conveyances, reservoirs, facilities, and water treatment plants. Caltrans is responsible for construction of all State and Federally designated highways throughout California. MWD and Caltrans currently have laboratories that conduct technical assessments of coatings utilized on their public structures, the results of which are often relied upon by other related public entities. The comments herein reflect our common views and concerns as affected agencies located in the state of California.

16-1 MWD, DWR and Caltrans continue to be supportive of the efforts to reduce volatile organic compound (VOC) emissions from the application of architectural coatings. We have attended the numerous workshops held to date, formally met twice with ARB representatives and have had various telephone discussions with ARB staff regarding the proposed SCM. As end-users of architectural/industrial maintenance coatings (IMC) on critical components of our public service systems, MWD, DWR and Caltrans have had concerns with respect to having sufficient time to identify and test the lower VOC IMCs to determine their adequacy to replace existing high performance coatings. The latest revisions to the SCM begin to address this concern by extending the proposed IMC effective date until January 1, 2004. While the 2004 extension will be beneficial, based on our collective laboratory experience and on preliminary testing results for the newer lower VOC coatings, we have comments regarding the basis for the compliance time frame. The specific comments and recommendations of MWD, DWR and Caltrans are provided below.

Availability and Performance of Replacement Coatings

The Draft Program EIR states that ARB staff has concluded that coatings that meet the proposed limit are technologically and commercially available and that such complying coatings perform as well as higher VOC IMCs. Information from manufacturer's product data sheets has been utilized to reach this conclusion. However, given MWD's past and recent experiences, we continue to have concerns regarding the actual performance of the lower VOC coatings.

16-2 As detailed in our July 21, 1999 comment letter, it has been MWD's past experience that approximately 80 percent of the coatings tested in its Corrosion Control Laboratory do not meet MWD's performance standards and are rejected for poor performance reasons. Also, 75 percent of the coatings tested by MWD do not meet the physical and performance characteristics stated in the manufacturer's technical product data sheets.

Preliminary results from current tests being conducted at MWD of the lower VOC coatings indicate a high rate of failure. Since the May 1999 adoption of SCAQMD Rule 1113, MWD began identifying and testing the new compliant coatings. High humidity testing of 75 coating systems (a system can consist of a primer, intermediate and/or topcoat), each represented by one-coated panel, was initiated. Passage of this test is critical for a coating to be considered for use as an IMC. Of the 75 coated panels, the preliminary results are as follows:

16-3

- After 90 days in test:
  - ✓ 16 (21 percent) are performing satisfactorily -- eight are 100 percent solids epoxy coatings that contain less than 100 g/l VOCs; four are high solids epoxy coatings that contain 100-250 g/l VOCs; and four are solvent borne epoxy and urethane coatings that contain 251-340 g/l VOCs
  - ✓ 59 (79 percent) are exhibiting signs of moderate to severe premature degradation and deterioration -- 46 contain less than 100 g/l VOCs; nine contain 100-250 g/l VOCs; and four contain 251-340 g/l VOCs.
- Coating types represented:
  - ✓ epoxy (high solids, water borne), direct to metal and top coats
  - ✓ waterborne urethanes, direct to metal and top coats
  - ✓ acrylic latex top coats
  - ✓ water based epoxy primers
- Degradation/deterioration mechanisms vary but are consistent in these areas:
  - ✓ uniform undercoat rust formation and nodules
  - ✓ top coat softening
  - ✓ osmotic blistering
  - ✓ discoloration, fading, chalking
  - ✓ loss of gloss and surface reflectance

Request for Time to Test

16-3 Based on the above-described experiences, we continue to recommend that sufficient time be provided to perform actual laboratory and field tests of new compliant coatings. While the manufacturer product information is useful in some regard, actual laboratory/field tests will be of the most significance. The 2004 time frame begins to provide this time, but is not in alignment with the current SCAQMD EPS provision that allows the use of 340 g/l VOC coatings for IMC purposes until 2006. As you are aware, a key aspect of the EPS provision is that the public agencies are to conduct a technology assessment of the new compliant coatings to demonstrate their feasibility and performance. By 2004, we anticipate that this technology assessment will produce a significant amount of critical performance data. As the information becomes available, we would like to forward it to ARB for evaluation. Therefore, we are recommending that the EPS technology assessment be formally recognized in the draft SCM (or associated Board Resolutions). Included should be a commitment by the ARB Board to review the results prior to 2004 and to take any subsequent action relative to the IMC VOC limit and effective date.

16-4 Additionally, the Draft Program EIR states that the 2004 time extension was provided to allow time for essential public service agencies to complete administrative processes before low VOC coatings can be used. While time is needed to account for our contract/bidding processes, MWD, Caltrans and DWR requested extending the IMC effective date primarily because of the concerns related to performance and availability of satisfactory coatings as described above.

Thank you for the opportunity to comment on the Draft Program SCM and to meet with ARB representatives to discuss our collective agencies' concerns. The ARB staff efforts to balance the needs of those affected by the SCM are very much appreciated. If you have any questions regarding these comments, please contact any of the representatives identified below.

Very truly yours,

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Re: California Architectural Coating Rule SCM – Comments of RPM, Inc.

Dear Mr. Nyarady:

On behalf of our client, RPM, Inc. ("RPM") and its operating companies,[1] we are providing the California Air Resources Board ("ARB") with comments on the Proposed California Architectural Coating Rule Suggested Control Measure ("SCM") dated February 11, 2000. These Comments are limited to the non-technical aspects of the rule. One of RPM's operating companies, Rust-Oleum, has commented on technical issues, including Industrial Maintenance Coating Category and ARB's proposed VOC-limits. Further, RPM endorses the comments of the National Paint and Coatings Association ("NPCA"), of which RPM and its operating companies are members. RPM urges ARB to act on the concerns expressed by RPM, Rust-Oleum and NPCA, and to revise the SCM accordingly. 17-1

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[1] RPM is a holding company that owns the stock in over 150 corporations, of which 41 are involved in the manufacture or importation of coatings that may be used for one or more applications subject to the Architectural Coating SCM. The affected companies are listed in Attachment A.

I. General Comments.

Impermissible and overly burdensome regulation of out-of-state manufacturers. As presently proposed, the SCM impermissibly shifts responsibility for attaining compliance with California's rule away from California employers and consumers who live and work in the State, and instead, places the burden for compliance on out-of-state manufacturers. The *Applicability, Definition, Labeling*, and *Reporting* provisions work together to compel manufacturers to produce, label, and market coatings that are unique not only for California as a whole, but potentially for each district in the State. We understand that the reason ARB has drafted the rule with these provisions is at the request of Enforcement. This philosophy to enforce against out-of-state manufacturers instead of Californians that inappropriately use coatings is not only unwarranted and unjust, but comes at high administrative cost to manufacturers. 17-2

The SCM is particularly onerous to small and mid-size manufacturers, such as RPM's operating companies, who produce so-called niche or specialty coatings intended for use under several rules, and not just as architectural coatings. RPM's small and mid-sized companies do not sell coating from their own retail outlets and do not have California-based sales and distribution systems, but rely on California retailers and distributors to know the rules of the districts in which they are located and to sell appropriate products for specific uses. To change our business practices and the way that we label, market and distribute our products would be prohibitively expensive. As a result, RPM's many small and mid-sized companies could not compete with large companies or in-state businesses at a competitive price. The rule and the anti-manufacturer attitude that it reflects, is likely to further reduce the number of small and mid-sized companies that do business in California.

To correct these flaws, we urge ARB to return the focus of the rule to the in-state users and retailers, and to bring the SCM into as close of conformity with the National Architectural Coating Rule as feasible. In our view there is no justification for creating California-unique coating category definitions, or requiring such categories of "intended use" to be put on product labels. Further, any reporting requirements should be made by distributors or retailers, who have direct knowledge of the products they sell in California.

Vague and ambiguous provisions. As explained more fully below, several SCM provisions are vague and ambiguous as to key provisions, especially as to the

17-3 rule the meaning of the term "manufactured for use." We request ARB to state exactly what this term means and how it the rule applies to manufacturers of products that are not "intended" solely for architectural use, and may be used legally under other coating rules in a district. By using this term in the Applicability and Definition sections of the SCM, is ARB implying that an out of state manufacturer will be liable if a product it manufactures is sold by a third party located in California and used by a California consumer in a manner that violates the rule? We request that the clarification be made available sufficiently before the Board Hearing to give industry ample opportunity to raise potential legal issues with the Board and ARB legal staff.

17-4 ***The SCM is not likely to achieve the expected VOC reductions.*** RPM believes the SCM is not likely to achieve the predicted 11-ton per day VOC reduction, because the ARB has failed to account for the shorter life cycle of the coatings mandated. At the March 16, 2000 Workshop, several industry technical representatives testified that the VOC levels established under the SCM would result in inferior coatings that will require more frequent maintenance. ARB staff dismissed these comments out of hand, instead deferring to a SCAQMD representatives' example of a railing that was painted with compliant coating three years ago and allegedly is still serviceable, and submittals of "proprietary data" that ARB staff has received. At the very least, ARB should state *on the record* the data on which they are relying to prove that Coatings meeting the SCM VOC levels will have the same life-cycle as present coatings.

17-5 ***ARB decisions improperly based on "off the record" data and communications.*** RPM is concerned that ARB has dismissed the testimony of industry on technical matters, and is relying on "confidential and/or proprietary" submittals that cannot be fully scrutinized by the regulated community. In addition, ARB appears to be relying and even deferring to SCAQMD staff's opinion on numerous policy issues. This was evident at the March 16, 2000 Workshop, when on several occasions ARB staff deferred to SCAQMD staff to answer questions and to give examples to contradict testimony being offered by industry representatives.

It further appears there has been significant interagency communication on all points relevant to developing the SCM, and that the nature and extent of these communications are not reflected in the administrative record. Although ARB should communicate with and solicit comment from other governmental agencies, we believe these contacts should not be off the record, but recorded in the administrative record as to the questions asked and the information provided. We

17-5 left the March 16th Workshop with the distinct impression that ARB's staff has had extensive communication with SCAQMD staff and other governmental agencies, and was not interested in the testimony of coatings manufacturers because it had already made up its mind on most points in the rule based upon private conversations and interagency dialog to which the regulated community has not be privy. We urge ARB to respond to the issues raised by industry, especially in regard to the VOC limits established in the SCM and the Industrial Maintenance Category, with ***objective and well reasoned explanations*** on the record. We also request that each conversation between ARB staff and other governmental agency representatives be placed in the administrative record as to the parties involved, the subject covered, and the information provided.

17-6 ***The cost analysis is over-simplified and does not consider the high business management costs this rule imposes on out-of-state manufacturers to comply with it.*** The cost analysis focuses only on the cost of "ingredients" and fails to consider or even to identify the significant on-going costs to manufacturers of implementing sales, distribution, and accounting systems needed to collect data to file reports and products in compliance with the proposed rule.

II. Comments on Specific Provisions.

17-7 *Applicability:* The SCM will apply "to any person who supplies, sells, offers for sale, or manufactures ***any architectural coating for use*** within the District." RPM has the following concerns. First, the term "for use" is undefined, may cause similar problems of interpretation to those that have arisen with regard to the automotive coatings rules in several districts. What is intended by "*manufactured for use* within the District?" Must a manufacturer have "specific intent" that the coating to be used for a specific purpose? If not, what factors will ARB use to decide if a generic or multiple use coating has been "manufactured for use in the District." Will ARB find that an out-of-state manufacturer "intended" a coating to be used in the District, merely because the coating is found for sale as an architectural coating by a third party in a District?

Second, even though coatings that are manufactured for use outside the district are exempted, there is no recognized exemption for coatings that may have legitimate use under other district rules, but may exceed the VOC limits in some possible applications under this rule. How will this be interpreted and applied?

Third, in regards to out-of-state manufacturers, RPM requests that ARB clarify what actions constitute "sells, offers for sale." Does ARB consider sales that occur out of state, to be within the scope of this rule if the product ultimately ends up in California.

17-7 RPM believes the Applicability section should be rewritten to apply to sales transactions occurring ***ONLY*** in California or out-of-state ***retail*** sales ***directly*** to end users in California. We believe any other interpretation puts California in the position of imposing restrictions on lawful commercial transactions that occur in other states and that should be governed by the laws of the states in which they occur. Any other interpretation of the Applicability provision places the SCM in jeopardy as it is beyond the scope of ARB authority and jurisdiction.

17-8 ***Definitions:*** As a threshold matter, the coating category definitions in the SCM differ from the National Rule, but also differ from SCAQMD Rule 1113. Thus, there will be at least three architectural coating category definitions in California -- districts adopting the SCM; the South Coast Air Quality Management District ("SCAQMD"); and districts defaulting to the National Rule. RPM believes there is absolutely no justification for such an industry-fragmenting and costly approach to the SCM. We urge ARB to use the National Rule as the model for the SCM and only depart from it where significant VOC reductions can be guaranteed with reasonable impact to the regulated community and California consumers.

17-9 The coating category definitions break from the usual format in that most (but not all) of the definitions include a requirement that the coating *"be labeled as and formulated for"* the "intended use" under the architectural coating rule. The definition structure is inherently unclear and ambiguous. By tying the definition of a coating category to the labeling and formulation, the "intent" of the manufacturer becomes the determining factor in whether a coating is appropriate for a given use. This is a fundamental change in the philosophy of California regulations. The end-user is presumed to have no discretion to choose a particular coating for a desired use. Without stating so explicitly, the SCM mandates that coating manufacturers know every district rule, every category of coating, and indicate the appropriate categories of use on each label for every district in the State. The scheme is unworkable, as it is the intent of the California user that is dispositive of the "intended" use of a product. Manufacturers do not and should not be required to produce coatings for only one purpose or use.

Second, it is not clear what constitutes "labeled." The terms "label" or "labeled" are not defined in the SCM. Under the state and federal Occupational Health and Safety Act, which sets the standards for labels for industrial use products, and the Federal Insecticide Fungicide and Rodenticide Act ("FIFRA"), which set standards for pesticides, labeling is anything that travels through commerce with the product, whether it is affixed to the container or not. Other federal laws define label similarly. The SCM appears to take ~~a~~ more restricted view of "labels", construing them to mean "container labels". As a practical matter, with the multiplicity of category definitions it may be difficult, if not impossible, to indicate the "use" of products for each California air district on an on-product label. 17-9

Further, it is not clear what is meant by the term "formulated for" the designated category. Coatings are formulated to have performance characteristics. To be economically viable, manufacturers must be able to market coatings for many purposes which share performance characteristics. ARB is regulating coatings first based upon the end-use of the coating, and secondarily by the performance characteristics. When the SCM indicates "formulated for" is it mandating that a coating manufacturer specifically formulate its coatings for the district rule at issue. Does the SCM require coating manufacturers formulate specific coatings for each district in the state, and label their products so that there will be no mistake about what uses are allowed? If this is intended, it should be stated, and the cost of this provision must be factored into the cost to industry to comply with this rule.

The requirement that manufacturers indicate uses on the label is certain to give rise to enforcement against manufacturers. With so many coating definitions, it may be extremely difficult to create a label that complies with the SCM. For so-called "generic coatings" that have uses under several rules including those that do not require labeling, the manufacturer could be considered in violation of the SCM for failing to have an architectural use indicated on the label, if the coating is sold in the district.

For the above reasons and to avoid confusion and costs, RPM requests ARB to strike the "labeled as and formulated for" phrase from the definitions in the SCM. RPM believes this provision is confusing, unworkable and unnecessary, especially in view of the labeling requirements in other provisions of the SCM.

17-10 ***Labeling***: The SCM includes a container labeling provision, which requires: a date code; thinning recommendations, and VOC content. In addition, there are specific requirements applicable to certain coating categories, including industrial

17-10 maintenance coatings, clear brushing lacquers, rust preventative coatings, and specialty primers. The SCM is not clear whether a coating that includes the information required under Labeling section fully satisfies, the "labeled as" requirement in the Definition section. If additional information is required, ARB should clarify what is expected of manufacturers to comply and provide examples.

17-11 *Reporting Requirements*: The SCM requires that manufacturers submit an annual report to ARB concerning the amount of clear brushing lacquers, rust preventative coatings, and specialty primers sold in the state. Manufacturers must also submit a report identifying all architectural coatings that contain perchloroethylene and methylene chloride and disclosing the volumes sold. To the extent that the SCM coating definitions differ with the National Rule and the multiple district rules, RPM believes that these reporting requirements may be difficult or impossible for an out-of-state manufacturer to comply with for the following reasons. First, it is unclear what is meant by "California sales," for the obvious reason that sales to California addresses may be exported and sales to out-of-state addresses may ultimately be used in the State. Thus, manufacturers do not have the data requested and little the ability to obtain it. ARB should impose the reporting this requirement on California distributors and retailers, who have direct knowledge of the coatings that are sold for use under this SCM in California.

III. <u>Other Issues</u>

17-12 *Enforcement.* At the Workshop, ARB indicated that the definitions and the labeling provisions were devised at the request of Enforcement. Several industry representatives complained that if ARB was concerned about the enforceability of the rule that it should engage in a dialogue with industry regarding the best way to enforce the rule. RPM again requests that ARM work with industry to establish workable enforcement provisions.

17-13 *Cost of the Rule to Industry.* At the end of the workshop, ARB made a presentation concerning the method that it will use to perform the economic analysis of the rule. ARB admits that the system that they are using emphasizes the increased cost of the raw material needed to make the paint, and minimizes the so-called one-time cost to reformulate, retool and relabel. ARB plans to get the information it needs to perform this analysis by sending industry a questionnaire. Based upon the presentation at the workshop and a quick review of the form, it appears that ARB will be missing a number of significant factors that will yield large cost impacts. For example, the cost of collecting data on California sales may

17-13 require companies to establish new and perhaps unique recording keeping and monitoring systems, if the data is to have any relevance at all. The cost of labeling and ensuring that only the appropriate coatings are sold in each district in the State is also likely to require additional manpower, and administrative systems.

17-14 RPM did not return the questionnaire, because we do not yet have adequate information on what it will cost to reformulate our coatings, and because the questionnaire did not ask for the on-going administrative cost of selling products in California and reporting the ARB.

* * * *

RPM thanks ARB for the opportunity to comment on the Draft Architectural Coating Rule SCM. We look forward to ARB's response to our the questions and requests for clarification. If you have any questions or require additional information, please contact me at the above number, or Charles Brush, Vice President Regulatory Affairs, RPM, Inc. at P.O. Box 777, Medina, OH 44258, (330) 273 8839 or cbrush@rpminc.com.

Sincerely,

Carol René Brophy
Counsel for RPM, Inc.
and its Operating Companies

Enclosure

CRB/hw
cc: Robert Burns, Bondo
Michael Murphy, Rust-oleum
Duane DeYoung, Rust-oleum
Ray Stewart, Bondo
Carlton Hanson, Bondo
Matt Stewart, DAP

RPM

Operating Companies Potentially Subject to ARB Architectural Coating Rule

(4/6/00)

Alteco Chemical S.A.
Amtred Limited
Bondo Corporation
Briner Paint Mfg. Co.
Carboline Company
Carboline U.K. Limited
Chemgrate Corporation
Chemical Coatings, Inc.
Chemrite Coatings (Pty.) Ltd. (80%)
Consolidated Coatings Corporation
DAP Canada Corp.
DAP Products Inc.
Day-Glo Color Corp.
Dryvit Systems, Inc.
Flecto Coatings Ltd.
Guardian Products, Inc.
Haartz-Mason, Inc.
Kop-Coat, Inc.
Mantrose-Haeusser Co., Inc.
Martin Mathys N.V.
Mohawk Finishing Products, Inc.
Multicor S.A. Argentina I.yC. (80%)
Paramount Technical Products, Inc.
Plasite Protective Coatings, Inc.
Radiant Color N.V.
Republic Powdered Metals, Inc.
RPM/Belgium N.V.
RPM/Europe B.V.
Rust-Oleum Corporation
Rust-Oleum Netherlands B.V.
Stonhard S.A.

TCI, Inc.
The Euclid Chemical Company
The Flecto Company, Inc.
Toxement S.A.
Tremco GmbH
Tremco Incorporated
Tremco Limited
Ultra-Tex Surfaces, Inc.
Weatherproofing Technologies, Inc.
Westfield Coatings Corporation
William Zinsser & Co. Incorporated

Celebrating 150 Years
ZINSSER 1849-1999

Wm. Zinsser & Co., Inc.
173 Belmont Drive • Somerset, NJ 08875-1285 • 732-469-8100 • FAX 732-469-4539

April 7, 2000

Mr. Jim Nyarady
California Environmental Protection Agency
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, CA 95812

RE: California Air Resources Board Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

18-1 Please accept the following comments to the recent Suggested Control Measure for Architectural and Industrial Maintenance Coatings (SCM) from the Air Resources Board (ARB). William Zinsser & Co., Inc. is a manufacturer of specialty primers, the mainstays of our business, and we are therefore very interested in these proposed changes and appreciate this opportunity to give you our input. We believe the proposed 2003 changes to the ARB architectural coatings regulations, with a few changes, can be implemented without drastic negative effect on the coating industry and our business.

<u>We have four recommendations:</u>

18-2
1. First, that the classification for Quick Dry Primer, Sealer and Undercoater be consolidated into the Specialty Primer category.

18-3
2. Second, that the definition of "Specialty Primer" be expanded to include additional common problematic conditions requiring a Specialty Primer.

18-4
3. Third, that the 350 g/L VOC limit for Specialty Primers be maintained beyond 1/1/2003.

18-3
4. Fourth, that the following category title and definition be adopted.

Category: Specialty Primers
Definition: A quick dry primer that: **seal stains**--e.g, fire, water, graffiti; tannin, nicotine; AND **seals odors**--e.g. fire, nicotine, urine; AND **bonds to glossy surfaces** (without abrading surface)--e.g., glass, ceramic, laminates; AND **adheres to chalky painted surfaces.** The coating must dry to touch in a 1/2 hour and can be recoatable in 2 hours when tested in accordance with ASTM D1640 - 89

These recommendations are based on the following reasons:

18-2
1. <u>The category Quick Dry Primer, Sealer and Undercoater (2.37) should be eliminated and its intention consolidated in to 2.36a Specialty Primers.</u>

a) CARB, by including 2.37 recognizes the need for a Quick Dry Primer. We submit however, the need for quickness of dry time should not be, and often can not be, separated from other performance properties required of Primer, Sealer and Undercoater. For example: The speed of dry is part of the reason that some alkyd primers are effective in blocking stains. If they did not dry so quickly they would not block the stain. We recommend that there be only one category that encompasses both the speed of dry and specific use areas.

An RPM Company

b) Furthermore, we recommend that the more specific title of "Specialty Primer" be adopted over the more general title, "Quick Dry Primer, Sealer and Undercoater." The term "Specialty Primer" recognizes that there are specific conditions that demand <u>special</u> treatment--surfaces damaged by fire (odor) and water (stains), or surfaces damaged by sunlight (chalky or friable). It is generally understood and accepted in the paint industry that such special surfaces can be primed only with special primers. Thus, our recommendation is that there be only one category, "Specialty Primers."

18-3 2. <u>There are additional surface conditions that require a Specialty Primer and should therefore be added to category definition.</u>

a) The CARB definition already recognizes that surfaces damaged by fire or water or that are excessively chalky need a Specialty Primer. In addition, Specialty Primers are needed to:

- Adhere to glossy surfaces without mechanical abrasion.
- Seal common stains--in addition to water and smoke stains, extractive wood stains, graffiti, nicotine, etc.
- Seal odors--nicotine, wood smoke, urine, etc.

3. <u>The VOC limit for Specialty Primers should be 350 g/L</u>.

a) CARB's proposes reducing the allowable VOCs for Quick Dry, Primer, Sealer and Undercoaters to 200 g/L effective 1/1/2003. We believe that that this goal can not be achieved, and if implemented, would effectively eliminate solvent thinned Specialty Primers. There is not now, nor is there in the foreseeable future, technology that will produce water-based primers that could be effectively substituted for 350 g/L solvent based primers.

18-4 b) The current Federal AIM rule allows Quick Dry Primer Sealers 450 g/L VOC. The majority of Quick Dry Primer Sealers today are near this higher Federal limit. Nevertheless, we submit that the 350 g/L VOC is obtainable by 1/1/2003, without significantly sacrificing product benefits, whereas 200 g/L is not.

N.B.: Wm. Zinsser & Co., along with other primer manufacturers, currently markets a "low odor" solvent based primer formulated using resins soluble in isoparaffinic solvents. (Zinsser's product is Bulls Eye Odorless) It will not be possible to reformulate these products to the 350 g/L level. Wm. Zinsser does not believe however, that the elimination of this type of primer should prevent implementation of 350 g/L VOC limits since its only differentiating benefit is lower odor and its other benefits can be experienced with other 350 g/L primers.

We appreciate the opportunity to provide our input on this very important issue. Please let me know if we can be of any assistance or answer any questions regarding our recommendations.

Thank you for your consideration.

Sincerely,

Michael Jurist

Michael Jurist,
Director of Operations

Cc: R. Senior, Wm. Zinsser & Co.

Subject: **[Fwd: Formulation Comments]**
Date: Thu. 13 Apr 2000 09:59:24 -0700
From: "Barbara Fry" <bfry@arb.ca.gov> Internal
To: Jim Nyarady <jnyarady@arb.ca.gov> , Nancy Adams <nadams@arb.ca.gov>, cyoung@arb.ca.gov, eota@arb.ca.gov, ewwong@arb.ca.gov, "Paul M. Milkey" <pmilkey@arb.ca.gov> , Floyd Vergara <fvergara@arb.ca.gov>

Subject: **Formulation Comments**
Date: Tue, 11 Apr 2000 18:27:50 EDT
From: JHLSPC@aol.com
To: bfry@arb.ca.gov

19-1 Floor Coating: Typiocal problems associated with two component formulations - also would expect poorer performance on exterior exposure than the alkyd.

19-2 IM: Would expect the two compoinent to have poor gloss reterntion - superior alkyd resistance but significantly poorer acid recistance.

19-3 Non-Flat: Would expect poor open time.

Quick Dry: Probably would not comply to current QD specifications

19-4 QD Primers: Probably would not work on extreme chalk surfaces.

19-5 Swimming Pool: Would expect to see blistering and peeling

jhl

TIME
TESTED
QUALITY

G & W Enterprises, Inc. dba
Trinity Coatings Company

1800 Park Place • Fort Worth, Texas 76110
Ph: 817-926-6811 • Nationwide: 800-777-5683
Adm. Fax: 817-926-9346 • Order Fax: 817-924-9661

April 12, 2000

Ms. Barbara Fry, Manager
Measures Development Section
Air Resources Board
P.O. Box 2815
Sacramento, California 95812
Ms Barbara Fry

Dear Ms. Fry,

Thank you for the time provided me by you and other ARB staff members to discuss the proposed Suggested Control Measure for Architectural Coatings. It is my hope that this visit provided some insight into the problems facing the coating industry and the consumers of these products.

20-1 The question came up about cost of reformulated lacquers to meet the 550 grams per liter requirement. The cost will vary widely based on the type of lacquer. For the type products most often used by the contractor, the raw material cost will increase some 65 to 80 cents per gallon. For some of the higher priced products the cost could remain the same or be a little less because of the acetone used to meet the V.O.C. requirement.

20-2 I hope it was made clear at our meeting that the major concern is not cost, but the ability to produce a workable product. Major problems occur when large quantities of acetone are used in a lacquer formulation. These problems include, loss of transfer efficiencies, loss of proper flow and leveling, increased danger of flash fires (because of low flash point, 0%F and wide flammability range of acetone, 2.59% to 13% of atmosphere), formula incompatibility from excess ketone solvent, blushing, and increased viscosity at application because of solvent loss during handling.

20-3 Included in this letter are six examples, three lower cost utility lacquers and three higher quality performance lacquers. In these groups are two formulas that have V.O.C. limits of 550 gr/lt in the can using the calculation method used to calculate V.O.C. in low solids coatings. If this method were used lacquers could be formulated with performance properties close to those of more conventional lacquers.

20-4 Nitrocellulose lacquers begin to disappear at a V.O.C. level of around 670 to 700 gr/lt without use of exempt solvents. Lower V.O.C. coatings using exempt solvents compromise proper solvent balance. Because of the problems stated I would ask that you consider a calculation method using the same procedure used to calculate low solid coatings and a V.O.C. limit of 550 gr/lt as packaged.

20-5 Regarding Industrial Maintenance coatings, the rules as written virtually eliminates the use of alkyds for primers & enamels. Because of the wide scope of this category, alkyd based coatings should not be eliminated. The loss of alkyd coatings will cause performance problems in some maintenance applications. There are no products presently available that perform as well as alkyds on poorly prepared surfaces. Many applications of waterborne acrylics would require an alkyd primer to perform well. Plural component products work well for their intended purpose, but they are not suitable as a general purpose coating.

20-6 The current Federal AIM rule would allows the manufacture of a quality industrial maintenance coatings. If you intend to keep all types of Industrial Maintenance coatings lumped together a more realistic number other than 250 gr/lt would be necessary. An alternative would be to break alkyd primers and enamels out to specific categories with V.O.C. contents that allow these essential coatings to exist.

20-7 One other area that needs attention is the non-flat coatings category. To produce a high quality waterborne acrylic requires a V.O.C. content over 200 gr/lt. and waterborne alkyds may run over 300 gr/lt.

20-8 The rule as written has many problem areas. The loss of so many coating systems could be very damaging. Coatings that have worked well will be lost. In most cases the replacement products will have no history of performance.

Included is information on lacquers that we discussed. If I can be of some help or provide more information, please let me know.

Respectfully,

Richard D. Williamson
Senior Vice-President
Trinity Coatings Company

Enclosures (3)

Trinity Coatings Co.
Richard Williamson
April 11, 2000

	UTILITY LACQUERS			PERFORMANCE LACQUERS		
	National 680	550 In Can	550 Less Water & Exempt Solvents	National 680	550 In Can	550 Less Water & Exempt Solvents
Acetone	0	81	298	0	100	315
Hydrocarbon	370	352	52	194	194	8
Ketone	57	24	20	197	96	42
Alcohol	66	56	53	64	64	51
Ester	36	16	166	101	101	119
Glycol Ether	14	14	10	0	0	17
Resin 1	169	169	0	0	0	0
Resin 2	0	0	141	0	0	0
Resin 3	0	0	0	119	119	112
Nitrocellulose	25	25	50	67	67	65
Additives	32	32	48	22	22	24

UTILITY

04/12/2000 Comparative Physical Properties Analysis Report

Formula Key :	F-NATIONAL 680	F-550 IN CAN	F-550 LESS W & E
TOTAL WEIGHT :	770.15	770.15	746.0
TOTAL VOLUME :	100.218	100.806	100.00
STD. COST/POUND:	0.410	0.400	0.510
STD. COST/GAL :	3.150	3.058	3.809
TOTAL VEH WT% :	100.000	100.000	100.000
TOTAL VEH VOL% :	100.000	100.000	100.000
PIGMENT WT% :	0.000	0.000	0.000
PIGMENT VOL% :	0.000	0.000	0.000
VOLATILE WT% :	70.589	70.589	71.432
VOLATILE VOL% :	76.602	76.738	78.247
ORG. SOLV. WT% :	70.589	60.026	35.871
ORG. SOLV. VOL%:	76.602	64.483	37.957
SOLIDS WT% :	29.411	29.411	28.568
SOLIDS VOL% :	23.398	23.262	21.753
VEH SOLIDS WT% :	29.411	29.411	28.568
VEH SOLIDS VOL%:	23.398	23.262	21.753
DENSITY :	7.685	7.640	7.461
SPEC. GRAVITY :	0.923	0.918	0.896
BULKING FACTOR :	0.130	0.131	0.134
P.V.C.% :	0.000	0.000	0.000
P/B RATIO :	0.000	0.000	0.000
SPREAD @ 1 MIL :	375.309	373.119	348.92
CPSFA @ 1 MIL :	0.0084	0.0082	0.01
G/L LESS EXEMPT:	650.030	626.287	537.082
VOC G/L :	650.030	549.535	320.694
L/G LESS EXEMPT:	5.425	5.226	4.482
VOC LB/GL :	5.425	4.586	2.676

04/12/2000 Comparative Physical Properties Analysis Report

Formula Key :	F- NATIONAL 680	F- 550 IN CAN	F- 550 LESS W & E
OTAL WEIGHT :	765.24	765.24	754.91
TOTAL VOLUME :	100.000	100.207	100.021
STD. COST/POUND:	0.597	0.583	0.604
STD. COST/GAL :	4.568	4.450	4.557
TOTAL VEH WT% :	100.000	100.000	100.000
TOTAL VEH VOL% :	100.000	100.000	100.000
PIGMENT WT% :	0.000	0.000	0.000
PIGMENT VOL% :	0.000	0.000	0.000
VOLATILE WT% :	72.723	72.723	73.120
VOLATILE VOL% :	79.944	79.985	80.504
ORG. SOLV. WT% :	72.723	59.655	31.403
ORG. SOLV. VOL%:	79.944	64.831	32.691
SOLIDS WT% :	27.277	27.277	26.880
SOLIDS VOL% :	20.056	20.015	19.496
VEH SOLIDS WT% :	27.277	27.277	26.880
VEH SOLIDS VOL%:	20.056	20.015	19.496
DENSITY :	7.652	7.637	7.548
SPEC. GRAVITY :	0.919	0.917	0.906
BULKING FACTOR :	0.131	0.131	0.132
P.V.C.% :	0.000	0.000	0.000
P/B RATIO :	0.000	0.000	0.000
PREAD @ 1 MIL :	321.703	321.037	312.708
PSFA @ 1 MIL :	0.0142	0.0139	0.0146
G/L LESS EXEMPT:	666.866	643.401	544.240
VOC G/L :	666.866	545.896	284.019
L/G LESS EXEMPT:	5.565	5.369	4.542
VOC LB/GL :	5.565	4.556	2.370

TROPICAL ASPHALT
14435 Macaw Street, La Mirada, Ca 90638
Toll Free 877-827-2622 * 714-739-1408 * Fax 714-670-1605

April 11, 2000

Mr. Jim Nyarady
California Air Resources Board
2020 "L" Street
P.O. Box 2815
Sacramento, California 95812

Reference: VOC content of Bituminous Roof Coatings

Dear Mr. Nyarady,

We apologize for not being able to appear with my fellow coating manufacturers at your hearing on Thursday, April 13, 2000 because of a previous commitment.

Tropical Asphalt is a manufacturer of both solvent-based and water-based roof coatings, cements and adhesives similar to Henry Company and Gardner Asphalt Corporation. Our primary customer base is the professional roofing contractor. We purchased the assets of Pacific Asphalt Corporation on September 1, 1998, who was in business in La Mirada, California for over 25 years. Our parent company, Tropical Asphalt Products Corporation is in Hallandale, Florida and has been in business for over 40 years.

21-1 We want to express our concern at your proposal to take the VOC level of bituminous coatings to 250 grams per liter, from the current 300 standard. This change will drastically reduce the workability of our coatings, especially at cold temperatures. The lower VOC will cause an increase in viscosity and will make the products much more difficult to use. It will severely alter our formulations and threaten our existence.

21-2 An even more oppressive proposal is your intention to reduce bituminous primers to 200-grams-per-liter. A requirement of 200 grams per liter would be the end of solvent-based primers. Exempt solvents are not workable. Only water based or acrylic primers would be possible and they have restrictions. Water based primers do not penetrate or wet surfaces properly. In addition, our industry ASTM standards would be destroyed. We believe the roofing community would either stop using primer, or blend their "own materials" on the job site which could potentially create a larger VOC problem.

21-1 & 21-2 In summary, we believe that the standards should remain where they currently are and that instituting your proposed new reduced standards would severely damage our industry.

Sincerely,

Bruce J. Hoberg
Vice President & General Manager
Tropical Asphalt L.L.C.

RESPONSES TO COMMENTS ON THE DRAFT PROGRAM EIR

Comment Letter #1:	**Valspar**
Comment Letter #2a:	**Textured Coatings of America**
Comment Letter #2b:	**Textured Coatings of America**
Comment Letter #3:	**Monterey Bay Unified Air Pollution Control District**
Comment Letter #4a:	**National Paint and Coatings Association**
Comment Letter #4b:	**National Paint and Coatings Association**
Comment Letter #5:	**U. S. Environmental Protection Agency, Region IX**
Comment Letter #6:	**Palmer Asphalt Company**
Comment Letter #7:	**FSC Coatings, Inc.**
Comment Letter #8a:	**Henry Company**
Comment Letter #8b:	**Henry Company**
Comment Letter #9a:	**The Sherwin-Williams Company**
Comment Letter #9b:	**The Sherwin-Williams Company**
Comment Letter #10:	**Rust-Oleum Corporation**
Comment Letter #11:	**Ventura County Air Pollution Control District**
Comment Letter #12:	**Golden Artist Colors**
Comment Letter #13:	**Los Angeles Department of Water and Power**
Comment Letter #14:	**Ameron Coatings**
Comment Letter #15:	**Kessler and Associates Business Services, Inc.**
Comment Letter #16:	**Multi-Agency (Essential Public Services)**
Comment Letter #17:	**McKenna & Cuneo**
Comment Letter #18:	**Wm. Zinsser & Co.**
Comment Letter #19:	**Smiland Paint Co.**
Comment Letter #20:	**Trinity Coatings Co.**
Comment Letter #21:	**Tropical Asphalt**

ARB received a total of 22 comment letters from 18 different commenters on the Draft Program EIR for the architectural coatings SCM before the end of the 45-day comment period. Additionally, ARB received three comment letters on the Draft Program EIR after the 45-day comment period. Furthermore, ARB received some California Environmental Quality Act (CEQA)-related comments during the March 16, 2000, public workshop.

Many of the comments submitted by the various commenters were not specifically CEQA-related; rather the comments were directed to the scope and structure of the SCM. However, the comment letters and responses to the comments contained in the 25 total comment letters, as well as responses to CEQA-related public workshop comments, are contained herein. Chapter VI of the Staff Report also contains responses to comments that were made regarding the SCM, but do not specifically relate to the Draft Program EIR.

COMMENT LETTER #1
Valspar
February 14, 2000

1-1. Comment: Our response to the ARB cost survey reflects the allocation of 44% of our R&D budget to complying with the proposed standards. However, this does not mean that we can achieve the desired VOC level and maintain performance for every quality in every category; it just means we have dedicated resources to make the attempt. We can make low cost, low quality products that meet the 2002 standards, but we cannot maintain performance in higher quality products that the consumer expects to perform. We get few complaints on low quality paints because consumers don't expect much, but the expectations on higher quality paints ($15 to $25 per gallon price) is much greater.

Response: No response relative to cost impacts is necessary here, since the commenter does not state his position on the proposed standards' commercial feasibility, but instead focuses on the performance aspects of reformulated products. As such, this comment deals with the technological feasibility of the proposed standards and is more appropriately addressed along with similar comments elsewhere in this report.

1-2. Comment: Because the company manufactures mostly high end paints, it cannot use the averaging provision; the company does not make enough low end paint to "bank" with what they need on the high end.

Response: Although the proposed SCM does not currently include an averaging provision, we are currently working with interested parties to develop such a provision. An averaging provision would provide manufacturers with some additional flexibility to meet the regulation. Under such an approach a coating manufacturer would be able to average the emissions of overcomplying coatings with the emissions of noncomplying coatings. South Coast AQMD Rule 1113 contains such a provision and we are looking at their approach for the SCM with the inclusion of a sunset date. We plan to propose an averaging provision for the SCM when it is presented to the Board at the June 22, 2000, board meeting.

While this provision may not provide enough emissions to offset all of this company's high VOC products, it may help when used in conjuction with reformulation efforts.

1-3. Comment: The commenter submitted test results of paints that he formulated at different VOC levels. The tests of interior/exterior high gloss paints showed that the test formulations at 150 grams per liter (g/l) and 50 g/l did not perform as well overall as currently-marketed paints made by Valspar formulated at 203-248 g/l VOC. Also, available resins for formulating high gloss exterior paints at low VOC levels are not adequate for making paints with performance up to the standards of the commenter's existing higher quality products. (Note: The letter was discussed with the commenter at his request; some of his points were clarified during the discussion.)

Response: In our technical evaluation we identified several high gloss exterior (including interior/exterior) coatings on the market with VOC levels less than 150 g/l that are classified as premium quality by their manufacturers. The 150 g/l limit was the originally proposed VOC limit for the entire non-flat coatings category and is the interim limit adopted by the South Coast Air Quality Management District (South Coast AQMD or SCAQMD) for non-flat coatings. The responses to Comments #2-12, #3-34, #3-35, #10-3, and #16-6 in the Draft Program Environmental Impact Report (EIR) were consistent with applying the 150 g/l limit to the entire non-flat coatings category. However, after further evaluation, we are now recommending that the non-flat coatings category include a separate subcategory for high gloss coatings with a VOC limit of 250 g/l. Our recommendation is due primarily to enforcement concerns, especially for California districts with fewer enforcement resources than the South Coast AQMD. Many high gloss non-flat coatings satisfy the gloss and dry time criteria of quick-dry enamels, a separate category in the SCM with a proposed VOC limit of 250 g/l. We recognize that there is overlap between the high gloss non-flat and quick-dry enamel categories, and that companies could relabel products rather than reformulate them if the VOC limit is different for those two categories. Moreover, some high gloss products might be illegally labeled as quick-dry enamels even if they do not meet the dry time criteria, which would be problematic for enforcement personnel in some districts to detect. For greater enforceability, we modified the proposed SCM to include a subcategory for high gloss non-flat coatings that has the same VOC limit as the quick-dry enamel category.

Since most districts' architectural coatings rules currently include a quick-dry enamel category, the proposed SCM retains that category with its new VOC limit. This was done so that district rules, once amended in accordance with the proposed SCM, will clearly show that the VOC limit for quick-dry enamels is reduced from 400 g/l to 250 g/l. Further, we recommend that districts eventually eliminate the quick-dry enamel category from their architectural coatings rules, which would in effect require such products to meet the VOC limit of the high gloss non-flat subcategory.

COMMENT LETTER #2a
Textured Coatings of America (TCA)
February 17, 2000

The commenter submitted two letters on the above date, which are combined in these responses. The commenter also attached and incorporated by reference a letter addressed to Textured Coatings of America from Jack P. Broadbent, SCAQMD, dated May 5, 1999.

2a-1. Comment: A variety of technical reasons are provided as to why the SCM should include a category for "waterproofing concrete/masonry sealers" with a limit of 400 g/l. The technical discussion provided relates to the commenter's XL-70® product line, which consists of high performance coatings that have been repeatedly reformulated to the lowest possible VOC content of 400 g/l.

Response: Although previous responses to this commenter indicated that we did not believe such a category and associated limit were necessary, our current proposal is to include a waterproofing concrete/masonry sealer category with a limit of 400 g/l. This decision is based on review of additional information provided by this as well as other members of industry related to this category. We now believe this category and associated higher limit is necessary to address a greater variety of application and performance needs than was previously realized. The proposed category and associated limit of 400 g/l is consistent with SCAQMD Rule 1113.

2a-2. Comment: TCA currently employs 65 people. In addition, there are hundreds of people who make their living selling and applying these products. If the Waterproofing Concrete/Masonry Sealer category were eliminated, one of the outcomes for TCA would be to close its Los Angeles factory and relocate it outside of California. This could be economically and socially devastating for many of our employees, some who have been with TCA in excess of 30 years or more and whose livelihoods depend on the operation of this factory.

Response: Based on comments received, the proposed standard for Waterproofing Concrete/Masonry Sealer has been raised from 250 to 400 g/l. This particular manufacturer already complies with the standard. Because 400 g/l is the existing standard in the SCAQMD, other manufacturers should have little or no additional compliance costs to meet this limit in the rest of the State. Thus, there is no possibility of this category or this commenter's facility being eliminated in California as a direct result of the ARB's Suggested Control Measure. (See response to Comment #2a-1 of the Final Program EIR.)

COMMENT LETTER #2b
Textured Coatings of America
April 6, 2000

2b-1. Comment: A variety of technical reasons are provided as to why the SCM should include a category for “waterproofing concrete/masonry sealers” with a limit of 400 g/l. The technical discussion provided relates to the commenter’s XL-70® product line, which consists of high performance coatings that have been repeatedly reformulated to the lowest possible VOC content of 400 g/l.

Response: Although previous responses to this commenter indicated that we did not believe such a category and associated limit were necessary, our current proposal is to include a waterproofing concrete/masonry sealer category with a limit of 400 g/l. (See response to Comment #2a-1 of the Final Program EIR.)

COMMENT LETTER #3
Monterey Bay Unified Air Pollution Control District
February 25, 2000

3-1. Comment: The commenter points out that reference is made in the Draft Program EIR on page IV-60 that the significance thresholds of the SCAQMD tend to be the most conservative in California. The commenter has supplied a table, undertaken for the CAPCOA Planning Managers in 1998, of the significance thresholds of various districts throughout California, showing that several districts have lower thresholds than the SCAQMD.

Response: ARB staff thanks the commenter for supplying the table and we agree that several districts have more stringent CEQA significance criteria than the SCAQMD for pollutants. We have incorporated the table as Appendix H and refer to it in the text of the Final Program EIR.

However, it should be pointed out that because the project (the proposed SCM) will reduce emissions, the pollutant thresholds are not as relevant in this Final Program EIR as other significance criteria, such as water demand, water quality, public services, transportation/circulation, solid and hazardous wastes, and hazards. Since significance criteria for such impact topics are not included on the supplied table, we will continue to use those of the South Coast AQMD that were used in the Draft Program EIR. In addition, as was stated in the Draft Program EIR, the use of the South Coast AQMD's significance criteria is not intended to supplant individual districts' CEQA significance criteria. If a district has different significance criteria for a particular impact topic, the district will need to decide whether to use those criteria in lieu of the criteria discussed in this Final Program EIR. (Draft Program EIR, p IV-60)

3-2. Comment: ARB staff has prepared a thorough and comprehensive EIR that will be invaluable for districts who subsequently adopt the SCM.

Response: We appreciate the District's assessment of the value of the Draft Program EIR. As explained on pages I-2 and I-3 of the Draft Program EIR, the ARB's regulatory program has been certified by the Secretary of the Resources Agency, which authorizes the ARB to prepare a plan or other written document in lieu of an environmental impact report. However, because each district adopting the SCM will need to comply with CEQA requirements, the ARB chose the Program EIR format as being more useful to districts.

COMMENT LETTER #4a
National Paint and Coatings Association (NPCA)
February 28, 2000

The commenter submitted two letters on the above date, which are combined in these responses. The commenter also attached and incorporated by reference two letters from Textured Coatings of America, which are addressed in the responses to Comment Letter #2a of the Final Program EIR.

4a-1. Comment: ARB staff and industry need to have an open discussion on the findings of the Draft Program EIR, particularly technology and cost of reformulation issues raised by the proposed VOC limits in the SCM. The commenter references an attached letter regarding waterproofing concrete/masonry sealers as an example of the type of technology discussions that are needed. A full day meeting is needed for the March 16, 2000, workshop.

Response: At the commenter's request, the ARB held a full day meeting on the specified date. The schedule allowed time for a thorough discussion of the issues on each category, as well as a cost analysis discussion. The points made at this meeting are addressed in the respective category discussions in Chapter VI of the Staff Report, or in the March 16, 2000, workshop comments at the end of the Responses to Comments on the Draft Program EIR.

4a-2. Comment: Some manufacturers did not receive the cost survey, and they were directed to where a replacement copy could be obtained. The survey is still being completed by other manufacturers, but some information will be available for the March 16, 2000, workshop. The March 16 workshop will present an opportunity to more comprehensively discuss cost and feasible technology issues than has occurred previously.

Response: The cost survey was mailed to all respondents to the 1998 architectural coatings survey. Upon request, we provided additional time for manufacturers to complete the survey. Regarding the agenda for the March 16, 2000, workshop, the commenter is referred to the response to Comment #4a-1 of the Final Program EIR.

4a-3. Comment: Reference is made to comments submitted by Textured Coatings of America regarding ARB's rationale for not including a waterproofing concrete/masonry sealer category in the draft SCM. Reference is also made to a previous telephone conference, when the Sherwin-Williams representative did not receive a response when asking for specifics about the types of two pack floor coating systems staff has found to be available for non-professional homeowner use.

Response: Our current proposal is to include a waterproofing concrete/masonry sealer category with a limit of 400 g/l. (See the response to Comments #2a-1 and #2b-1 of the Final Program EIR.)

Regarding the comment about two-pack floor systems, staff has found two such products available in the Sacramento area, both are two component epoxy floor coatings. Both Home Depot, and Home Base, sell a product manufactured by Litex, Inc., called “2-Part Epoxy Waterbased Floor Coating.” Home Depot offers an additional product manufactured by Epoxi-Tech, Inc., called “Epoxy Shield.”

4a-4. Comment: The purpose of the SCM is to identify best available retrofit control technology to reduce districts’ need for extensive fact finding. The SCM must be based on facts, not “pie in the sky” hopes. To achieve this purpose, industry and staff must have frank and detailed discussions on feasibility.

Response: The ARB has not yet made any formal determination on what constitutes best available retrofit control technology (BARCT) for architectural coatings. BARCT is an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each source category (Health and Safety Code section 40406). While in the SCM staff has identified VOC limits that are technologically and commercially feasible, it may be more appropriate to identify more stringent limits as constituting BARCT. As discussed in Chapter IX of the Staff Report, ARB staff plans to perform additional work in the future to evaluate more stringent VOC limits. However, ARB staff does agree with the commenter that the SCM is designed to be relied on by the districts, in order to reduce or eliminate the districts’ need for extensive fact finding when the districts adopt their own architectural coatings rules. We also believe that the provisions of the SCM are based on facts, not on “pie-in-the sky” hopes. The facts supporting the SCM are set forth in detail in the Staff Report and in the Final Program EIR.

4a-5. Comment: The NPCA fully endorses the comments made by the Textured Coatings of America (see Comment Letter #2a of the Final Program EIR).

Response: The comment is noted. (See responses to Comments #2a and #2b of the Final Program EIR.)

4a-6. Comment: The SCM development process concerns the commenter. ARB staff has not adequately considered the technical information provided by industry, both orally in public and private meetings, and in written submissions. Staff has not engaged in dialogue with submitters of the information that would indicate a genuine interest in determining what VOC limits are technologically and economically feasible. Instead, staff has declined to engage in any discussions of specific performance characteristics with industry representatives, except general statements indicating that they believe the limits are technically feasible. The commenter references and attaches letters from Textured Coatings of America as examples of the detailed, technically sound arguments that staff has not responded to. When questioning the ARB’s lack of meaningful responses, or the continued inclusion of unjustifiably low VOC limits in the draft SCM, the commenter was told to wait for the rationale presented in the technology assessment in the draft EIR.

Response: As noted in the responses to Comments #3-16 and #3-26 of the Draft Program EIR, the ARB staff has conducted extensive technology evaluations in more than 60 categories. Based on the ARB's review of resin manufacturers' and coating formulators' product information sheets, which includes weatherability data, and NTS and Harlan test data, low-VOC coatings with performance characteristics comparable to traditional coatings are available to meet the proposed SCM VOC limits.

To date the staff has conducted eight workshops (five workshops specifically focused on the proposed SCM) where industry members, the public, air districts, and the U.S. EPA have had an opportunity to express their concerns. The ARB has considered more than 100 comment letters, held about 40 meetings with individual stakeholders, and held 20 meetings and conference calls with districts and U.S. EPA. Individual staff made dozens of phone calls to manufacturers, and carefully analyzed data provided by manufacturers. The results of this fact-finding and outreach process were thoroughly discussed in the Draft Program EIR.

The commenter is referred to the responses to Comment Letter #2a of the Final Program EIR regarding his comments on the Textured Coatings of America letters.

We disagree with the commenter's claim that ARB staff has not engaged in dialog with submitters of technical information. In fact, ARB staff has contacted manufacturers to gather basic facts about complying and non-complying products, to request more information about submitted data, and to clarify workshop comments throughout the process. At every workshop and in every workshop notice, the ARB has requested that stakeholders meet with ARB staff to discuss matters of individual concern. Also, the Draft Program EIR (DEIR) comment period exists for formal written comments which must be addressed prior to the release of the Final Program EIR.

4a-7. Comment: Reference is made regarding the DEIR's discussion of "Concrete Protective Coatings" found at page 186. The comment indicates that none of the information provided in the DEIR adequately responds to the chief technical point made by Textured Coatings of America – *i.e.*, the lower VOC (<400 g/l) coatings do not have all of the important properties of Tex-Cote XL-70® Coating.

Response: Our current proposal is to include a waterproofing concrete/masonry sealer category with a limit of 400 g/l. The referenced product, Tex-Cote XL-70®, has been reformulated to comply with this limit. (See response to Comments #2a-1 and #2b-1 of the Final Program EIR.)

4a-8. Comment: The magazine article used in the section for concrete protective coatings showed that low VOC concrete coatings don't have the same performance characteristics as higher VOC coatings.

Response: The referenced article was used only to help describe concrete protective coatings and their uses. It was not used as a technical basis for a proposed VOC limit, since the SCM does not include a separate category for concrete protective coatings. As stated in Chapter VI of the Staff Report, these coatings are included in the waterproofing concrete/masonry sealer coating category.

4a-9. Comment: An SCM is supposed to identify available technology so districts don't have to reexamine the recommended technologies. The drawbacks of lower VOC coatings for particular applications should be examined and discussed as thoroughly as conclusions that the coatings are technologically feasible.

Response: The Staff Report for the SCM does identify available technology to comply with the proposed VOC limits. The ARB staff considered the potential drawbacks of lower VOC coatings for particular applications in determining the technological feasibility of each limit. Where appropriate, a discussion of these potential application limitations is included in each category discussion in Chapter VI of the Staff Report. For example, specialty categories such as the antenna coatings category were included in the SCM to meet the needs of particular applications.

4a-10. Comment: The commenter requests that the SCM include a Waterproofing Concrete/Masonry Sealer category with a limit of 400 g/l.

Response: Our current proposal is to include a waterproofing concrete/masonry sealer category with a limit of 400 g/l. (See response to Comments #2a-1 and #2b-1 of the Final Program EIR.)

COMMENT LETTER #4b
National Paint and Coatings Association (NPCA)
April 7, 2000

4b-1. Comment: NPCA recognizes the obligations of the industry to contribute coatings technology improvements, and the industry has lowered VOC content without regulatory prodding. NPCA's role is to contribute its best estimates of technological feasibility and the consequences and costs of certain technologies, and to that end has consistently urged its members to cooperate with ARB in surveys and in individual meetings to discuss technology issues. The commenter is disappointed in the process utilized to adopt the SCM and in the lack of adequate fact finding. The SCM will stand as a presumptively valid decision about cost effective, commercially viable, and technologically productive coatings for the California districts. NPCA represents the full spectrum of coatings manufacturers, including low VOC coatings manufacturers.

Response: The ARB staff sincerely appreciates the efforts of NPCA in coordinating with its members throughout the development of the 1998 architectural coatings survey and the proposed SCM. However, we disagree with the commenter's characterization of the SCM development process.

Our public process has included eight workshops, 20 meetings and conference calls with districts and representatives of the U.S. EPA, and 40 individual meetings with manufacturers, suppliers, user groups, associations, and other interested parties. Our workshop announcements, SCM revisions, reports, surveys, workshop summaries, workshop slide presentations, and lists of workshop attendees have been placed on the ARB's Internet site.

Although we repeatedly stressed at our workshops and in written communications that we welcomed individual meetings with manufacturers to discuss issues of individual concern, only about seven percent of the manufacturers who responded to the architectural coatings survey took advantage of this opportunity. Only about four percent of the survey respondents provided comparative test data.

In contrast to the commenter's characterization of a lack of fact finding, we believe we did extensive fact finding in the development of the SCM. The technology and economic assessments included an evaluation of manufacturers' brochures, product data sheets, product labels, and material safety data sheets; Internet websites; books and trade magazines; technical reports; training manuals; evaluation of test results and specifications; U.S. EPA's Background Information Document; SCAQMD staff reports from Rule 1113 amendments; interviews with manufacturers and users of coatings; evaluation of 1998 survey data; comparison of district rules and discussions with district staff; the 1989 SCM technical support document; seven meetings with resin manufacturers; patents searches; shelf cost surveys; evaluation of actual laboratory data and third party testing provided by individual manufacturers; starting formulations from resin suppliers and coatings manufacturers; and information from trade organizations including NPCA.

We believe it is appropriate for the districts to use the SCM as a document that identifies cost effective, commercially viable, and technologically productive coatings.

4b-2. Comment: NPCA does not contend that only high VOC coatings technology is presently or forseeably available. Rather, NPCA believes that low VOC technology can be used to meet the performance requirements of one particular application and exposure environment of a general class of coatings. However, a thorough evaluation of this technology must occur before it can be mandated for all or most of the application, performance, and exposure requirements of that general class of coatings. The commenter does not believe a thorough, open minded, and objective evaluation of existing and reasonably foreseeable coatings technology has occurred in conjunction with setting future VOC limits. Some NPCA members most concerned about the proposed limits are those that manufacture and emphasize sales of their low VOC coatings because of their profitability.

Response: We disagree with the commenter's characterization of our evaluation of coatings technology. We did look at application, performance, and exposure requirements for both complying and non-complying coatings for a variety of usage requirements and substrates, both in evaluating product information and in evaluating the National Technical Systems (NTS) data. We also evaluated testing data provided by manufacturers and users of coatings. We evaluated resin technologies for a variety of application, performance, and exposure requirements within a given category. For example, in the industrial maintenance category, we looked at coatings recommended for chemical storage tanks, tank lining and piping, and immersion service. Where we found that there was a need for higher VOC limits than the general industrial maintenance limit, we established new categories, such as rust preventative coatings, temperature-indicator safety coatings, high temperature coatings, antenna coatings, anti-fouling coatings, and flow coatings. We also added language to allow for higher VOC industrial maintenance coatings to be used in foggy areas of the North Central Coast, San Francisco Bay Area, and North Coast Air Basins. Table IV-2 of the Final Program EIR summarizes some of these important properties, and Appendix E of the Final Program EIR contains more detailed information about the products evaluated. Overall, our assessment demonstrated that overall, complying coatings exhibit performance similar to non-complying coatings.

4b-3. Comment: The SCM is a "suggestion" from a reviewing authority that ultimately has the authority to disapprove district plans. As a practical matter, districts do not deviate significantly from SCMs, even though they have reservations about their conclusions. The Program EIR needs to be as accurate as possible so that districts can rely on it without further consideration.

Response: The ARB staff agrees that the SCM is a nonbinding model rule, and that individual districts will ultimately decide whether or not to adopt the SCM, or some modified version of the SCM. In order to promote statewide uniformity in architectural coatings rules, the ARB encourages the districts to adopt the SCM without making significant modifications. Districts retain the ultimate authority to control this source category, however, and in the past, districts have made a number of changes to architectural coatings SCMs approved by the ARB. The ARB staff agrees that the Program EIR should be as accurate as possible so that districts, if they choose to do so, may rely on it in their rule adoption process. ARB staff believes that the Program EIR does accurately discuss the potential environmental impacts, and reaches appropriate conclusions.

4b-4. <u>Comment</u>: The commenter is deeply concerned about the fundamentally flawed conclusions about the technological and economic feasibility of many of the VOC limits. If staff has erred about the technological feasibility, then the environmental impacts are equally flawed.

<u>Response</u>: The commenter is referred to the responses to Comments #4b-1 and #4b-2 of the Final Program EIR for a discussion of the components of the technological and economic feasibility assessment. For the reasons stated in these responses, we disagree with the commenter's characterization regarding our conclusions reached in these areas, and therefore we do not believe that the environmental impacts assessment is flawed.

4b-5. <u>Comment</u>: Because the SCM is only guidance, it does not need to comport with the requirements for a rulemaking. This has the potential for a classic "Catch-22." If the technology is not consensus technology, the public never has a realistic opportunity to fully air its concerns; the SCM is conducted without the requirements of legally sufficient fact findings, and the districts are not required to reconsider the findings except as their discretion dictates. This raises concerns about the potential for denial of due process and interference with interstate commerce, as the resulting regulation may impose disproportionate burdens on out-of-state manufacturers.

<u>Response</u>: The ARB staff agrees that the SCM is nonbinding guidance, and does not need to be adopted under the formal rulemaking procedures of the California Administrative Procedure Act. However, the process employed by the ARB results in <u>more</u> opportunities for industry and the public to protect their interests, not less. The ARB will hold a public meeting on the SCM at which the industry and the public can voice any concerns they may have. In addition, under the CEQA process the ARB staff has responded in writing to all of the comments made on the Draft Program EIR. Included are responses to comments on the feasibility of the technology for making complying coatings, since the issue of whether these coatings will perform properly is one of the central issues in evaluating whether adverse environmental impacts will result from the SCM. Having such a process at the statewide level is an advantage to industry, since industry can focus its resources on a single forum, instead of having to expend the resources to participate in many individual district rulemakings. After this extensive process at the statewide level, each district must then conduct a separate process under state law to adopt its architectural coatings rule. Affected companies thus have another opportunity (if they so choose) to raise any issues that they believe the Program EIR has not adequately evaluated, as well any district-specific issues that they may have. The procedures described above are more than adequate to satisfy any due process or constitutional concerns. Finally, we do not agree that the SCM imposes disproportionate

burdens on out-of-state manufacturers, since the VOC limits specified in the SCM apply uniformly to all persons who sell or manufacture coatings for sale in California, regardless of whether such persons are located within or outside of the State.

4b-6. Comment: The staff has relied on: results of laboratory tests from NTS and Harlan studies; what is characterized as "extensive" review of compliant coatings product data sheets; results from the 1998 ARB architectural coatings survey that shows a large percentage of coatings already meet the proposed limits; and information on "foreseeable coatings technologies" obtained from resin suppliers, manufacturers' data sheets, and promotional magazine articles.

Response: The commenter is referred to the response to Comment #4b-1 of the Final Program EIR for a listing of the information sources used in the technology assessment. As discussed in that response, we used every source of information available to us. We repeatedly asked manufacturers for supplemental performance data, and we considered all of the information submitted to us.

4b-7. Comment: The EIR's treatment of available test data manifests fundamental misconceptions about the effective use of such information by the industry. Coatings manufacturers extensively test new coatings before introducing them to the market. These tests include two and three-year field exposure tests because it is only under such real world conditions that new coatings' performance characteristics can be assured.

Response: The Draft Program EIR relied on information from a variety of sources, which included test data. The Draft Program EIR also considered the wide range of commercially available products that comply with the proposed VOC limits. As stated in the comment, the manufacturers of these coatings have undertaken extensive real time exposure testing prior to their introduction to the market to ensure reliable performance.

4b-8. Comment: Any decisions about the technological and economic feasibility of the limits proposed in the SCM for the six categories being evaluated in the NTS study should be postponed until the final results of the study are complete. Proceeding with SCM adoption of limits for these six categories will require local air districts to evaluate the technology of the limits for these coatings before accepting them as feasible.

Response: The ARB staff disagrees with the commenter's assertion that decisions on the technological and economic feasibility of the limits for the six coating categories in the NTS study should be postponed until the final results are made available. As stated in the Draft Program EIR, there is a wide range of commercially available coatings that meet the proposed VOC content limits in the SCM, including the six coating categories being examined by the NTS study. The coating industry states that prior to making a product commercially available it undergoes extensive real time exposure testing to ensure reliable performance. The initial results (laboratory) of the NTS study support the fact that commercially available products that meet the proposed limits provide comparable performance characteristics to existing higher VOC coatings (see Appendix E of the Staff Report). Finally, the ARB regards the NTS study as only one of the pieces of information used to reach its conclusion that the proposed limits are technologically feasible. Thus, sufficient evidence is available to establish that the proposed VOC limits are technologically feasible, and we do not believe that is will be necessary for districts to reevaluate the VOC limits before accepting them as feasible.

The cost-effectiveness or economic feasibility of the SCM is addressed in the ARB staff's economic analysis, which is contained in the Staff Report.

4b-9. Comment: The ARB has rejected industry's request to formally commit to a technical assessment of the SCM limits prior to their becoming effective. The statements made by the ARB (see Draft Program EIR C 7-8) indicate that the conclusions of the staff about the feasibility of the limits proposed in the SCM are suspect and will require further analysis.

Response: The ARB does not feel it is necessary to formally commit to a technical assessment by including language in the actual text of the SCM. After all, the SCM is intended as a model rule for adoption by the districts, and it would not be appropriate to include an ARB commitment in a district rule. Moreover, the ARB believes that compliant coatings are currently available to meet the proposed limits in the SCM. The 1998 ARB Architectural Coatings Survey, coating manufacturers' product data sheets, and initial results of the NTS study support this conclusion. The ARB does remain committed to work with industry and districts as they conduct technology assessments of future VOC limits like those included in South Coast AQMD's Architectural Coatings Rule 1113, and ARB staff intends to conduct technology assessments for the eleven proposed limits that are more stringent than the predominant limits in existing district rules. This type of assessment is routinely done for ARB consumer products and motor vehicle regulations. Such a routine commitment does not mean that ARB staff is uncertain about the feasibility of the VOC limits in the SCM.

4b-10. Comment: The NTS laboratory results that are available are suspect in their own right as has been explained to staff in a letter from Christine Stanley, Vice President of Technology, of Ameron, and in NPCA's letter to Jim Nyarady on this subject.

Response: The letter by Christine Stanley of Ameron contained comments directed at the industrial maintenance category results only. The comments can be summarized into coating descriptions, test methods used, and lack of control samples. The comments regarding coating descriptions discuss the need to clarify a coatings resin type (*e.g.*, epoxy *vs*. zinc rich epoxy) or VOC contents reported by the manufacturer. The ARB anticipates that, if appropriate, the SCAQMD will incorporate necessary changes to coating descriptions in the final NTS report.

Regarding the appropriateness of some of the test methods used and lack of control samples, the commenter is reminded that the Technical Advisory Committee (TAC) reviewed, selected and approved all test methods and protocols used for the NTS study. The NTS contractor performed all tests as outlined by assigned test methods or protocols. The TAC, which is primarily composed of members of industry, but also includes

SCAQMD, ARB, and one environmental group, has presided over the NTS project since the beginning. The TAC was involved in all aspects of the project including project design, selection of the contractor, coatings to be tested, and ongoing status meetings to address any unpredicted issues.

4b-11. Comment: The Harlan study is an incomplete report, providing only raw data, and the evaluation of these data was left to ARB staff. Information on individual coatings such as use and application of the coatings was not included in the report. The report was not peer reviewed. Blind samples were used, making verification of the results impossible. Different contractors were used and many of the tests were subjective. No mention of QA/QC procedures was indicated.

Response: The Harlan study is only one of the many pieces of information we used in evaluating the performance of complying versus non-complying coatings. The results were analyzed not only by ARB staff but by staff of the Ventura County Air Pollution Control District. The Harlan study was published in February 1995. The purpose of the study was to determine the VOC content and physical properties of 110 products in eight coating categories. The study did not include any analysis of the data or conclusions by design in order to minimize any potential bias of the contractor. The published raw data allows for peer review and analysis by all interested parties.

As mentioned earlier, the primary intent of the Harlan Study was to compile VOC content and physical properties of coatings. This information would then allow a more objective review of physical property changes with varying VOC contents. The coating samples used in the study were intentionally blinded to avoid any potential bias. Information on individual coatings was available in the form of coating category type (*e.g.*, primer/sealer, lacquer, industrial maintenance, non-flat, sanding sealer, waterproofing sealer, and industrial maintenance) that are well defined and understood in the coating industry. In addition to coating category type, information on each coating was provided regarding solvent classification (*i.e.*, water-based, solvent-based) and binder classification (*e.g.*, acrylic, epoxy, polyurethane, *etc.*). Product names for each coating were never published at the request of the manufacturers.

The characterization by the commenter that the tests were subjective is incorrect. VOC and performance tests on the coatings samples used in the Harlan Study conducted by the contractor and subcontractors utilized test methods developed by the American Society for Testing and Materials (ASTM), the Federal Test Method Standard (FTMS), Federal Specifications and the contractor.

The assertion that there was no mention of QA/QC procedures is also incorrect. Program management of the subcontractors in this contract included inspection of the subcontractor’s facilities, quality control/cross check analyses by the contractor, and frequent discussions to maintain excellence in analysis and reporting. The contractor duplicated a minimum of 20 percent of the subcontracted testing. Data analysis of the subcontractor and contractor test results was within the precision limits cited by the respective ASTM methods.

We utilized the Harlan study results to support and supplement the newer NTS study. The NTS study was commissioned by the SCAQMD, in conjunction with a technical advisory committee comprised of industry, government agencies, and environmental groups. The technical advisory committee designed the testing protocols, decided which coatings to test, and evaluated the results. The ARB staff has performed an independent analysis of the NTS results, which are found in Appendix E of the Staff Report. The commenter is referred to the response to Comment #4b-1 of the Final Program EIR for a listing of the other information we utilized in our technology assessment.

4b-12. Comment: The EIR's comparisons of low VOC coatings in Table IV-2 are based on relatively insignificant properties (*i.e.*, range of VOC, average VOC content, average solids by volume, average coverage, average dry time, average pot life, average shelf life) of coatings that do not say anything about performance and durability, or suitability of a coating for a particular job.

Response: In addition to the summary table mentioned by the commenter, more detail on each coating evaluated is in Appendix E of the Draft Program EIR. Manufacturers have repeatedly told us that solids, coverage, dry times, pot life, and shelf life are vital factors in determining performance. In fact, the commenter has mentioned some of these factors in this letter. We disagree with the commenter's assertion that these properties do not relate to performance, durability, or suitability of a coating for a particular job. We have provided laboratory durability data where it is available to supplement the information from the product data sheets.

4b-13. Comment: A true comparison of a coating's characteristics must consider performance, application latitude, surface latitude, cost effectiveness, and waste. These issues must be addressed when evaluating whether a coating can be substituted for another, an especially complex task with industrial maintenance coatings.

Response: All of the coating characteristics were considered by ARB staff. We considered performance, through the use of product data sheets, the NTS study, the Harlan study, and data provided by manufacturers. We evaluated product data sheets for information on application latitude and surface latitude. We also considered cost effectiveness, which is discussed in detail in Chapter VIII of the Staff Report. We considered waste impacts in Chapter IV of the Draft Program EIR. We also considered testing data provided by manufacturers or users of coatings. As a result of these evaluations, in the proposed SCM for the Final Program EIR (Appendix A), we are proposing changes to the industrial maintenance category. We are proposing five industrial maintenance breakout categories, anti-fouling coatings, flow coatings, temperature-indicator safety coatings, rust preventative coatings, and antenna coatings. We are proposing to include the rust preventative category, consistent with the National Rule and SCAQMD Rule 1113. Finally, we are proposing a provision that would allow the use (in appropriate situations) of higher VOC industrial maintenance coatings for the districts in the San Francisco Bay Area, North Central Coast, and North Coast Air Basins, where areas exist with persistent fog and low temperature conditions.

4b-14. Comment: It is obvious that the ARB did not consider the factors mentioned in Comment #4b-13 of the Final Program EIR in its review of product data sheets, but coatings formulators, specifiers, and applicators would consider these factors crucial in determining suitability of a coating for a particular application. Districts should undertake an evaluation of these factors.

Response: Manufacturers provide product data sheets to their customers. These customers include formulators, specifiers, applicators, as well as do-it-yourselfers. We believe it is likely that manufacturers' product data sheets are providing accurate and understandable information to these customers, since there could be considerable liability in providing imprecise information. In addition to product data sheets, we also looked at product labels and MSDSs, both of which are subject to legal requirements. As explained in the response to Comment #4b-13 of the Final Program EIR, the ARB did consider performance, application latitude, surface latitude, cost effectiveness, and waste considerations in developing the SCM. Our intent in developing the SCM and the Final Program EIR is to consider all of these factors to minimize or eliminate additional work for the individual districts. We believe that we have thoroughly considered all of these factors, and, accordingly, it should not be necessary for districts to undertake a separate, additional evaluation when they adopt their own rules.

4b-15. Comment: Too much reliance has been placed on product data sheets for staff's conclusions. Product data sheets often require review by a coatings expert to be fully comprehended. The ARB's conclusion that low-VOC coatings do not require substantially more surface preparation than conventional coatings is completely at variance with industry knowledge, and training and education by industry associations. Two-component high performance coatings require more attention to proper surface preparation than conventional coatings. While conventional coatings also require adequate surface preparation, it concerns the commenter that ARB staff equates the degree of surface preparation required by the two types of instructions that are associated with radically different coatings. The commenter is concerned that staff does not fully comprehend the greatly differing consequences with using these two different coatings systems.

Response: As we explained in the response to Comment #4b-14 of the Final Program EIR, manufacturers provide product data sheets for their customers' use, including do-it-yourselfers, and we believe that it is appropriate to assume that this information is correct. We disagree that for full comprehension, coatings experts must review product data sheets. The product data sheets for industrial maintenance coatings may be more complex and require review by a coatings expert, but these coatings are not used by do-it-yourselfers. As the commenter mentions in Comment #4b-6 of the Final Program EIR, we did not rely solely on product data sheets in performing our technology assessment. Product data sheets were only one of the many sources of information that staff considered in its assessment.

With regard to the surface preparation issue, the commenter quotes the response to Comment #2-14 in the Draft Program EIR. This comment relates to potential depletion of groundwater supplies due to power washing. On page IV-84 of the Draft Program EIR, under the analysis for water demand, we explained that "...manufacturers' recommendations are the same for conventional and low-VOC coatings (*i.e.*, apply to clean, dry surfaces). It is not expected that these recommendations would change if additional coatings were to be reformulated as a result of the SCM."

A more detailed discussion of surface preparation is in Chapter VI of the Staff Report, under the industrial maintenance category description. Because of the variety of uses and types of coatings, the recommended surface preparation and application methods vary. For more demanding situations, abrasive blasting, etching with muriatic acid, high-pressure water blasting, hand tool cleaning, or wire brushing may be required. In less demanding situations, such as clean and dry surfaces, the use of primers or base coats may be appropriate. Surface preparation is important for both conventional coatings and two component coatings, and the degree of surface preparation depends on the substrate and the environment in which the coating is used.

On page IV-84, the ARB staff is indicating that the manufacturers' recommendations for surface preparation are the same for conventional and low-VOC coatings (*i.e.*, apply to clean, dry surfaces). Thus, the ARB staff is indicating that the environmental impacts of power washing are not significant.

4b-16. Comment: Staff's conclusion based on product data sheets that pot life problems are not expected with multi-component coatings is at variance with the real world experience of industry. Individual product data sheets may minimize the problems or state that they are not substantial if instructions for use are closely followed. Pot life is a significant and complex issue affecting the cost of application.

Response: The commenter is quoting the response to Comment #2-24 in the Draft Program EIR. As we explained in the response to Comment #4b-14 in the Final Program EIR, manufacturers provide product data sheets for their customers' use, and it is reasonable to assume that this information is materially correct.

As the commenter mentions in Comment #4b-6 of the Final Program EIR, we did not rely solely on product data sheets in performing our technology assessment. We agree that instructions must be closely followed for successful use of two-component coatings. The commenter's concerns about heavy reliance on two-component coatings in the industrial maintenance and floor coatings categories have been addressed in the proposed SCM. Specifically, we have raised the VOC limit for floor coatings to 250 g/l to address overlap with other categories, which also allows for the use of more single component coatings. We have included five breakout categories from industrial maintenance (rust preventative coatings, flow coatings, anti-fouling coatings, temperature-indicator safety coatings, and antenna coatings), all with higher limits to allow for the use of more single component coatings.

Regarding the pot-life issue, Tables E-10 and E-11 show that pot-lifes, on average, are not significantly greater for 420 to 250 g/l industrial maintenance coatings than for $\leq$250 g/l industrial maintenance coatings. Thus, industrial maintenance applicators are already familiar with pot life issues with current coatings. However, the analysis on solid waste/hazardous waste on pages IV-101 through IV-106 of the Draft Program EIR concludes that even if some compliant coatings were placed in a landfill due to freeze-thaw, shelf-life, or pot-life problems, the solid waste impact would not be significant. We did not indicate that there are no pot life problems associated with multi-component systems.

4b-17. <u>Comment</u>: The coatings industry cautions the ARB about using of the 1998 Architectural Coatings Survey data. The commenter indicates that the current existence of low VOC product technology may be successfully used to meet the performance requirements of one particular application and exposure environment of a general class of coatings. However, there must be a thorough evaluation of this technology before it can be mandated as being feasible for all or even most of the application, performance, and exposure requirements of the general class of coatings to which it belongs.

<u>Response</u>: The 1998 ARB survey is just one of many sources of information relied upon by the ARB. Product application, performance, and exposure requirements were considered and evaluated through the use of the NTS and Harlan studies. The ARB reviewed information on hundreds of commercially available products that comply with the limits proposed in the SCM. The commenter would probably agree that, in general, commercially available coatings have undergone extensive real time exposure testing prior to their introduction to the market to ensure reliable performance.

4b-18. <u>Comment</u>: Caution should be exercised in relying on information from resin and coating manufacturers and on articles published in non peer-reviewed trade journals. These materials are meant to be a starting point for coating formulators, and should not be assumed to represent adequate, cost-effective coatings.

<u>Response</u>: As explained in the response to Comment #4b-1 of the Final Program EIR, we did not rely solely on information from resin and coating manufacturers, nor from articles in non peer-reviewed trade journals. We realize that these materials may be promotional in nature and that following the recommendations in these materials do not necessarily result in adequate, cost-effective coatings. We relied on the totality of the information available to us, including that provided by manufacturers.

4b-19. <u>Comment</u>: Many of the coating products listed in Appendix E do not belong in the coating category listed. For example, over 30 percent of the products listed as lacquers are in reality polyurethane varnishes.

<u>Response</u>: Based on input from manufacturers, the tables in Appendix E of the Final Program EIR have been modified to more accurately reflect the correct coating categories. With regard to lacquers in Appendix E, Tables E1 through E3 listed a total of 132 product samples. The ARB staff did find 21 of 132 (16 percent, not

30 percent) products miscategorized and have removed them from Table E for lacquers. This modification to Table E does not affect any of the conclusions reached in the Final Program EIR.

4b-20. Comment: ARB is proposing to expand the SCM definition of floor coatings to cover floors exposed to extreme environmental conditions which historically have been covered by the industrial maintenance category.

Response: This comment actually refers to the exclusion of floor coatings from the SCM definition of industrial maintenance coatings. The definition of industrial maintenance coatings has been modified and no longer excludes floor coatings.

4b-21. Comment: The data sheets that ARB is relying on to make a decision concerning the VOC limit for floor coatings cover a wide variety of product type and coatings technologies. Several of the specific coatings listed as floor coatings do not belong to the floor coatings category.

Response: Staff agrees that available floor coatings include a wide variety of product types and coatings technologies. Staff also agrees that there are products miscategorized in the Draft Program EIR listings. Staff has attempted to make all appropriate corrections to this as well as other categories. These corrections are relatively minor ones that do not affect the conclusions reached in the Final Program EIR.

4b-22. Comment: It should be obvious from the wide variety of products currently being sold as floor coatings, that no single product or technology is able to satisfy all of the varying application conditions and performance requirements covered by this category. To rely on high end two component or polyurethane technologies, as the basis for the proposed limit does not reflect the true market place needs for floor coatings in all situations such as industrial, institutional, commercial and residential. A recommended revised definition for floor coatings is provided.

Response: Although staff believes a 100 g/l limit for floor coatings is achievable by technologies other than two component epoxy or polyurethane systems, the proposed limit has been modified to 250 g/l. There are several reasons for this increase in the proposed floor coatings VOC limit.

The primary reason is to avoid enforcement issues that may arise from overlaps between categories with different limits. The categories of concern here are industrial maintenance, floor, stains, and waterproofing wood sealers. Many floor coatings could readily be categorized into one of these other similar categories. Having the same limit apply to these categories simplifies enforcement which is a major concern for smaller air districts with limited resources.

A limit of 250 g/l for floor coatings also increases the number of currently available compliant single component products available. This increase in compliant product availability also addresses concerns regarding the wide variety of products currently being sold to satisfy all of the varying application conditions and performance requirements covered by this category.

A limit of 250 g/l for floor coatings also addresses other concerns raised regarding their use as industrial maintenance coatings. (See response to Comment #4b-20 of the Final Program EIR.)

4b-23. Comment: The definition for "industrial maintenance coatings" should be revised to remove the phrase "excluding floor coatings but."

Response: We have revised the definition for industrial maintenance coatings as requested. Also, see responses to Comments #14-1 and #14-2 of the Final Program EIR.

4b-24. Comment: The commenter is particularly concerned with the proposed VOC limits for non-flat coatings; primers, sealers, and undercoaters; stains; industrial maintenance coatings; and lacquers. The commenter has facilitated information exchange between coatings experts and ARB staff regarding the technological and economic feasibility of the proposed VOC limits. The commenter urges ARB to consider the information and comments provided, and to rely on the consensus judgement of the coatings experts in establishing VOC limits for the SCM.

Response: We have taken the comments and information provided by the coatings experts into consideration in our technical evaluation of the proposed VOC limits for the categories mentioned. We weighed such comments alongside other information such as ARB survey data on complying marketshares, product information from manufacturers, laboratory performance tests, and information on available resin technology. Changes to the VOC limits or use conditions in some of the mentioned categories (*i.e.*, non-flat coatings, specialty primers, sealers, and undercoaters, and industrial maintenance coatings) have been proposed.

Specifically, in the non-flat coatings category, we have changed the proposed VOC limit for high gloss non-flat coatings to 250 g/l, which is consistent with the recommendations made by NPCA coatings experts. This change, however, was made primarily due to enforcement concerns (see response to Comment #1-3 of the Final Program EIR).

The specialty primer, sealer, and undercoater category allows for 350 g/l coatings for stain blocking and excessively chalky surfaces.

Regarding industrial maintenance coatings, we have proposed in the SCM separate categories for three of the small "national" categories (antenna, flow, and antifouling). From discussions with coatings experts and the information they have provided, we have determined that the three categories contain small volume coatings for which a limit higher than 250 g/l is appropriate. We have also included a category for temperature-indicator safety coatings and rust preventative coatings. We have proposed a climate-related provision for industrial maintenance coatings to allow use of coatings up to

340 g/l to address problems caused by persistent fog and low temperature conditions prevalent along certain parts of the California coast. This provision was developed through coordination with coatings experts from essential public service agencies, who have expertise and actual-use experience with high-performance coatings applied under those climatic conditions. (See responses to Comments #3-17 of the Draft Program EIR, page C-24; responses to Comments #13-4 and 15-24b of the Final Program EIR; and section 3.8 of the proposed SCM.)

We believe the proposed VOC limit for stains is technologically and commercially feasible by the January 1, 2003, effective date based on our review of the literature and trade journals, complying marketshare, existing regulatory limits, literature searches, and information provided by manufacturers or resin suppliers. The new alkyd/acrylic hybrid polymers, alkyd-modified acrylics, and modified acrylic/water dispersible drying oil formulations provide acceptable open times that result in reduced lapping potential; minimal, if any, grain raising; and better penetration. In addition, the use of water-based pre-stain and wood conditioners will reduce grain raise on all bare wood surfaces. Penetration has also been enhanced by advancements in pigment technology, which have substantially reduced the size of available pigments, which results in better penetration. (See responses to Comments 9b-12, 9b-13, 9b-14, 9b-15, and 9b-16.)

For lacquers, the proposed 550 g/l VOC limit is based on information from manufacturers, product availability, and complying marketshare. The use of acetone as an alternative VOC exempt solvent has resulted in the development of 550 g/l lacquers without sacrificing significant properties preferred by the wood finishing industry. Major manufacturers have introduced nitrocellulose lacquers using acetone to lower the VOC content to 550 g/l. SCAQMD Rule 1136 – Wood Coatings was amended in June 1996 to include a 550 g/l limit for lacquers. At that time, the coating formulators (coating experts) supported the SCAQMD 550 g/l limit for lacquers. Akzo-Nobel, Dunn-Edwards, Frazee, Rodda, Trinity, and other manufacturers (see Appendix E, Table E-3, Final Program EIR) have all introduced lacquers at or below the proposed 550 g/l limit. Finally, the ARB 1998 Architectural Coating Survey identified 138 products comprising approximately 14 percent of the California market that comply with the proposed limit for lacquers.

4b-25. Comment: Staff has reconsidered its initial decision to exclude the “concrete protective coatings” category recognized by the national AIM rule and now plans to incorporate this category with a 400 g/l limit into the SCM. We endorse the inclusion of this category.

Response: Staff is not proposing to incorporate the concrete protective coatings category into the SCM. However, staff is proposing to include a waterproofing concrete/masonry sealer category with a limit of 400 g/l in the SCM. We believe this category covers those products that would fall under the national “concrete protective coatings” category while maintaining consistency with SCAQMD Rule 1113. (See response to Comments #2a-1 and #2b-1 of the Final Program EIR.)

4b-26. Comment: Inland Coatings provided information to ARB staff requesting that a “thermoplastic rubber coatings and mastics” category be added to the regulation.

Discussions with staff about the exchange of information between Inland Coatings and staff indicate that there may have been some miscommunication. Staff stated that the company failed to provide sufficient information to demonstrate that its thermoplastic rubber products are more durable, and result in less emissions over time than comparable bituminous roof products or latex roof products. It is our understanding that the company has attempted to respond to these points and is prepared to provide more information on this matter. With respect to durability, it is generally accepted information within the industry that coatings like Inland's dramatically outlast bituminous coatings, which are of limited durability. Inland Coatings can demonstrate single application, no repair histories for its coatings extending over several years. The same is true of its claims about adhering to single ply membranes, with one of the major manufacturers of single ply membrane coatings recommending Inland Coatings for repair of its product. Finally, concerning the fact that the company's product is not used in California, this has occurred only because the company has refused requests for distributors to carry its product for unregulated areas in California because of concern that the product would inadvertently be sold in regulated areas.

<u>Response</u>: Inland Coatings requested a "thermoplastic rubber and mastics" category with a 550 g/l VOC limit, as provided in the National Rule, and they have stated that their product outlasts alternative asphaltic products, as noted by the commenter. However, when contacted, Inland Coatings was not able to offer test data or any other information to substantiate their claims about product life and lower overall emissions compared to lower VOC asphaltic or elastomeric latex products that are currently used in California. In addition, we did not receive any additional information during the public comment period on the Draft Program EIR, despite the commenter's assertion that Inland Coatings is prepared to provide additional information.

4b-27. <u>Comment</u>: The proposed SCM would require the use of nuclear coatings that would be astronomically more expensive than existing systems and this added expense is grossly disproportionate to the minuscule amounts of VOC emissions that result from the small usage of the existing coatings systems.

<u>Response</u>: See response to Comment #14-6 of the Final Program EIR.

4b-28. <u>Comment</u>: (a) The ARB staff should reconsider its decision to exclude the coatings categories in the U.S. EPA's architectural coatings rule that are not in the SCM. We do not believe that the staff have had an opportunity to receive or fully review all of the information that would be necessary in order to make a sound decision on these coatings. The process to date has focused on the larger coatings categories. Many of the niche coating categories excluded from the SCM are produced by small businesses that need more time to respond.

(b) ARB staff should recognize that coatings are developed for certain purposes. In this highly competitive industry, if a lower VOC product can cost effectively serve the same coatings requirements of a high VOC product, it is selected over the higher VOC products. The U.S. EPA recognized this and created separate categories for certain low volume niche coatings that previously fell under the general category of industrial maintenance, but needed a higher VOC content than the lowered VOC level for industrial maintenance.

(c) The EIR is very cursory in its discussion of the excluded national categories, often stating little more than assumptions that are based upon the general coatings category of industrial maintenance coatings. Data concerning these coatings may not have been reported under the category. For example, with respect to chalkboard resurfacing coatings, the EIR reflects that only a very small portion of the coatings reported in the CARB AIM survey were identified as chalkboard resurfacing coatings. It is likely that some of the volume used in California was reported as general industrial maintenance coatings.

(d) ARB staff should consider the possibility that information developed later in the rulemaking will demonstrate that indeed a higher VOC limit is required for the national categories excluded from the proposed SCM, or for other excluded categories. We plan to provide additional information on these coatings, as it becomes available to us.

Response: (a) As detailed in the Draft Program EIR, each of the coatings categories that were included in the U.S. EPA’s National Rule were fully evaluated for possible inclusion in the proposed SCM. Based on these evaluations, some additional categories that are not included in current district regulations (antenna, flow, antifouling coatings) were added to the proposed SCM. We believe that companies, including small businesses, have had ample opportunity to provide information to ARB staff. In developing the proposed SCM, we have held eight public meetings attended by representatives from industry.

(b) We disagree that lower VOC products will automatically be chosen over their higher VOC counterparts. Consumers make buying decisions on a variety of factors, including price, availability, color choices, brand recognition, product label information, and marketing claims. There is no credible evidence that VOC content is a major factor to most customers (except, perhaps, in cases where there is a choice between a higher VOC solvent-based paint and a lower VOC water-based paint). Similarly, manufacturers of coatings also base manufacturing decisions on a variety of factors, not solely on the VOC content. We recognize that the national categories not included in the SCM will fall under one of the more general coatings categories in the SCM, such as the industrial maintenance category. This was considered in evaluating each of these categories for possible inclusion in the SCM.

(c) ARB staff reviewed all available information on the national categories. The EIR discussions of many of the national categories excluded from the proposed SCM are brief because there was little information available or provided by industry. If companies misreported some of their niche products in other coatings categories in the ARB survey, they should notify ARB staff. These companies have had ample opportunity to review the survey results and comment on discrepancies.

(d) ARB will consider any additional information provided by industry or other interested parties. If information received in the future demonstrates the need to modify a particular VOC limit, appropriate changes will be made and forwarded to the districts.

4b-29. Comment: We are concerned that the ARB has not chosen to include an averaging compliance option in the proposed SCM or at least retain the placeholder statement on averaging that appeared in the December 1, 1999 draft of the SCM. The industry agrees that differences exist between industry, SCAQMD, and ARB on how to design a workable averaging program. The ARB has chosen not to move forward with trying to resolve these difficulties. Instead the ARB appears to have placed a lower priority on averaging by indicating that the existence or absence of an averaging program does not affect the ARB's analysis of the technical feasibility of the VOC limits in the SCM or the ARB environmental analysis for the SCM. Industry disagrees and feels averaging will be required to make some of the requirements feasible. Without an averaging provision the proposed SCM is more restrictive than the SCAQMD's current Rule 1113.

Response: Although the proposed SCM does not currently include an averaging provision, we are currently working with interested parties to develop such a provision to be presented at the June 22, 2000, Board meeting. Please see the response to Comment #1-2 of the Final Program EIR. ARB staff continues to believe (as discussed on page V-159 of the Draft Program EIR) that each of the VOC limits in the SCM is independently feasible, and that averaging is not necessary to make the SCM feasible. Rather, an averaging provision would be proposed to provide flexibility and increased cost-effectiveness for industry.

4b-30. Comment: Alternative B, extending all of the effective dates for the VOC content limits to January 1, 2004, was considered infeasible because any delay in achieving emission reductions is not technically or economically justified. The commenter disagrees with this conclusion in light of industry's comments on the technical merits of the SCM development.

Response: We disagree. No evidence was presented by the industry suggesting that the compliance date should be postponed, except for the industrial maintenance category. We cannot justify postponing emission reductions because our analysis indicates the proposed VOC limits are technologically and economically feasible by January 1, 2003 (January 1, 2004 for industrial maintenance coatings).

4b-31. Comment: (a) There are fundamental problems with the use of model formulas to estimate potential material costs. The approach carries the inherent assumption that only one coating technology (resin technology) will be used to meet the lower VOC limits. Said another way, the approach implies that one technology will meet all the requirements of a category. This is unlikely and therefore the approach will not accurately estimate associated reformulation costs.

(b) The model formulas are simplistic. Generally, one cannot simply substitute a low VOC resin for a high VOC resin without changing other important components of the coating. To obtain anything close to approximating a realistic estimate using this approach would require the use of real world formulas.

<u>Response</u>: (a) The commenter incorrectly interprets the purpose of the model formulas. Contrary to the commenter's suggestion, the model formulas are not intended to reflect any inherent assumption that only one coating technology will be used to meet the VOC limits. Indeed, staff has gone to great lengths to discuss in detail the various types of coating technologies that will be used by manufacturers to meet the VOC limits (see Appendix D of the Draft Program EIR) However, the fact that there are numerous options for reformulating products, many of which differ only slightly from other coatings in the category, makes it highly impractical to develop numerous model formulas for each coating category. Rather, we believe it would be appropriate to develop more than one model formula for a category only when that category is further divided into subcategories, each subcategory having its own VOC limits. To do otherwise would not be consistent with staff's view that one limit is appropriate for one category or subcategory, even if there are a variety of technologies represented within each category.

Most coatings within a given category have relatively similar compositions, varying primarily in the type and amount of non-volatiles (*e.g.*, resins, binders, pigments, *etc.*). Thus, we believe the better approach to use <u>for purposes of estimating cost impacts</u> (as opposed to showing technical feasibility) is to develop representative model formulas for each category, which would then be used to generate low and high cost estimates. The low and high cost estimates would be estimated by using the low and high unit costs (*i.e.*, dollars per pound of raw material) for each component in the model formulas, especially the non-volatiles. For instance, the low-cost complying formulation in a category might have a unit cost of $0.60 per pound for resins, while the associated high-cost complying formulation might have a unit cost of $0.72 (assumed 20 percent increase) per pound of resins.

It is important to note that, as part of our standard practice, we have provided preliminary model formulas for the industry to comment on and suggest alternative model formulas if alternative model formulas are deemed appropriate. This approach of using model formulas with industry input on the appropriateness of each model formula has been reviewed and accepted by the regulated consumer products industry over the ten years of ARB rulemaking in the consumer products arena.

(b) We agree that one generally cannot simply substitute a low VOC resin for a high VOC resin without changing other important components of the coating. However, the changes to the other important components of a coating are likely to involve changes to the type of component (*e.g.,* change from solvent A to solvent B), rather than changes to the amount of each component. Thus, we believe it is important to vary the unit price of the resin and other non-volatiles, to obtain low and high cost estimates as described previously, while maintaining the unit price of the other components in a coating. However, it should be noted that we would consider changing the model formula components and their weight percents in any given category based on credible and persuasive evidence provided by manufacturers to show that alternative model formulas are more appropriate.

4b-32. Comment: (a) A more straightforward and more accurate way of estimating and comparing raw material costs of high and [low] VOC coatings would be to compare only the cost of the high VOC resin to the low VOC resin on a weight or volume solids basis. By doing this, one would at least get an idea of the magnitude of the cost difference, *e.g.*, 1.5 times or 2 times more costly. To get a better cost comparison beyond this, one would need actual VOC formulas for the current high VOC product and the low VOC replacement.

(b) It is also important to note that raw material costs are only one factor in calculating the total cost of reformulating coatings. Additional costs include packaging costs, direct R&D labor, *etc.*

Response: (a) We disagree with the first part of the comment and agree with the second part. Because a coating is comprised of many components, only one of which is the resin, a comparison of only the cost of high VOC resin to low VOC resin would be inappropriate. To illustrate, let's say a coating's resin cost doubled from $1.50 to $3.00 per pound. Using the commenter's suggested methodology, we would report a 100 percent increase in materials cost for this category under this scenario. However, the commenter neglects the fact that resins represent only a fraction of coatings. Thus, if the above coating has a resin content of 50 percent by weight, and the remaining 50 percent costs $1.00 per pound, then the actual materials cost increase would be 60 percent, which is significantly less than the 100 percent increase under the commenter's suggestion [*i.e.*, old cost = (0.50 x $1.00 + 0.50 x $1.50) = $1.25, new cost = (0.50 x $1.00 + 0.50 x $3.00) = $2.00; percent increase = ($2.00/$1.25 – 1) x 100 = 60 percent]. As this example illustrates, the actual increase or decrease in total materials cost is dependent on the amount and unit price of each component in a coating, not just the change in resin cost.

We do agree with the commenter that a better analysis than the one he suggests would use actual VOC formulas for the current high VOC product and the low VOC replacement. This is exactly why we use actual formulations obtained from either the ARB Architectural Coating Survey or from trade journals or other published sources. As we stated in the March 16, 2000, workshop, the model formulas we are using in the cost impacts analysis are based on actual formulations obtained from the ARB's architectural coatings survey or manufacturer-supplied formulations that have been modified slightly to avoid divulging trade secrets.

(b) It is unclear why the commenter is implying that raw material costs are the only costs we will be taking into account, because information on one-time costs such as research and development (R&D), equipment modifications, labeling/packaging changes, and all other fixed costs are specifically requested in Table 1 of the Economic Impacts Survey we mailed to industry. (Economic Impacts Survey, page3) In addition, the respondents are requested to provide in Table 2 of the survey their estimates of annual on-going costs for complying with the proposed standards. (*Id.*) Moreover, the cover letter to the survey instructs as follows: “If you believe it would be useful to provide us with additional or explanatory information, please feel free to attach such information to your completed survey form.” We reiterated this several times at the March 16, 2000, workshop. Thus, we have made it clear that we are taking into account a wide variety of cost factors in addition to raw materials cost.

4b-33. Comment: The commenters intend to continue to work with ARB staff to provide their best judgment and technical information about the technological and economic feasibility of the coatings technology decisions CARB is contemplating. Ultimately, the issue of whether Californians will continue to have cost effective, productive coatings rests with the CARB and the districts.

Response: The ARB welcomes constructive input from NPCA and its member companies, as well as data that would enhance our expertise on technological, performance, economic, and related issues. The ARB and the districts take seriously their responsibility for assuring that Californians have cost effective, productive architectural coatings available.

COMMENT LETTER #5
United States Environmental Protection Agency (U.S. EPA), Region IX
March 1, 2000

5-1. Comment: The U.S. EPA is primarily concerned with the clarity and enforceability of the SCM and its stringency relative to the National Rule and current coating technology. The postponement of the effective date of the regulation and the addition of several specialty coating category definitions and limits are significant changes from previous versions of the SCM, but are generally consistent with national regulations and reflect available current coating technology.

Response: The comment is noted.

5-2. Comment: It is not clear how the “temperature-indicator safety coatings” differ from the “high temperature coatings.” Both types of coatings must sustain exposure to temperatures above 204ºC (400ºF). Does the ability of “temperature-indicator safety coatings” to change color necessitate the higher VOC limit in the proposed SCM?

Response: Yes, the ability of the “temperature-indicator safety coatings” to change color for the purpose of safety necessitates a higher VOC limit. The proposed new category is for coatings that are primarily used for safety, rather than primarily as a conventional, anti-deterioration coating in the “high-temperature coatings” category. The description and technical assessment for the proposed “temperature-indicator safety coatings” category is included as Section A-26 of Appendix D of the Draft Program EIR.

5-3. Comment: The removal of certain language in Sections 3.2.2, 3.2.5, 3.2.8, and 3.2.9 has broadened the exception to Section 3.2 (Most Restrictive Limit) in the SCM. The additions of Sections 3.2.11-14 also widen the scope of the exceptions to Section 3.2. Collectively, these changes make the “Most Restrictive Limit” provision of the SCM less stringent than the corresponding provision in EPA’s National AIM Rule. The differences between the wording of this section of the SCM and that of the National Rule may cause confusion among the regulated entities.

Response: The removal of certain language and the additions of Sections 3.2.11-13 do indeed broaden the scope of the exceptions, however, we believe the changes are warranted. These changes are intended to make Section 3.2 consistent with the various specialty categories included in the SCM. Although one may argue that this specific SCM provision is less stringent than the corresponding provision in the National AIM Rule, overall the SCM is still clearly more stringent. We do not believe the differences between the wording of this section of the SCM and that of the National Rule will cause confusion. These changes are intended to clarify and simplify the wording of Section 3.2.

5-4. Comment: It is unclear why labeling requirements for quick-dry and recycled coatings in a previous SCM draft have been removed. The labeling requirement for recycled coatings should be retained for consistency with the labeling requirements of the National AIM Rule.

Response: It was an oversight that the quick-dry labeling requirements were removed and appropriate portions of this section have now been restored.

The recycled coating compliance option in the National Rule is voluntary and allows manufacturers of such coatings to calculate an adjusted-VOC content, based on the amount of post-consumer material contained in the recycled coating. There are labeling and reporting requirements associated with this provision. The labeling requirement contained in a previous version of the SCM was similar to the labeling requirement in the National Rule, which required the labeling of the post-consumer coating content of the recycled coating. However, consistent with SCAQMD Rule 1113, the ARB staff has proposed simply applying a VOC limit to recycled coatings, and defined the minimum post-consumer and secondary coating content. Because there is no need to calculate the VOC content based on post-consumer coating content, the labeling requirement was judged to be burdensome and was removed. California manufacturers who choose to participate in the federal recycled coating program would have to comply with the federal labeling requirements.

5-5. Comment: The reporting requirements for recycled coatings contained in a previous SCM draft should be restored. This information must be reported to EPA under the National AIM rule, and would not represent an additional burden to manufacturers. The ARB should ensure than manufacturers are meeting the minimum percentages of secondary or post-consumer contents.

Response: The commenter is referred to the response to Comment #5-4 of the Final Program EIR for a discussion of the reason for the labeling and reporting requirements in the National Rule. Because we are proposing a VOC limit for recycled coatings, and not the provisions of the federal program, the ARB staff believes that reporting requirements to monitor the post-consumer and secondary coating content would be burdensome, particularly to many small manufacturers who already make recycled coatings. There is an economic incentive to maximize the amount of post-consumer and secondary coating used in recycled coatings, and to minimize the use of virgin coating. Consistent with SCAQMD Rule 1113, we are proposing only that manufacturers submit an initial notification of their status as a recycled paint manufacturer, and an annual report of the number of gallons of recycled paint produced. California manufacturers who participate in the federal recycled coating program would have to comply with federal reporting requirements.

5-6. Comment: The proposed 530 g/l VOC limit for antenna coatings, although consistent with the U.S. EPA’s National Rule VOC limit, may create a relaxation issue for certain districts who wish to add this category to their local rules and who have SIP approved rules containing a 420 g/l limit for industrial maintenance coatings.

Response: The emissions from the antenna coatings category are extremely small because this is a highly specialized niche category with limited applications. The VOC emissions from this category are estimated to be less than 0.01 tons per day statewide. As such, the loss in emission reductions in an individual district from raising the antenna coatings limit from 420 g/l to 530 g/l would be significantly less than 0.01 tons per day. This loss in emission reductions would be compensated for by the increased emission reductions from the VOC limits for other categories in the proposed SCM that would likely be adopted by districts along with the VOC limit for antenna coatings.

5-7. Comment: The category and VOC limit for low solids coatings appears twice in Table 1 of the draft SCM.

Response: This minor editorial error has been corrected.

COMMENT LETTER #6
Palmer Asphalt Company
March 6, 2000

The commenter has attached and incorporated by reference a previously submitted comment letter dated December 6, 1999. Responses are provided for both letters.

6-1. Comment: I would like to call your attention to my letter of December 6, 1999, as it concerns the proposed limits for both bituminous roof and bituminous roof primers, and which seems to have been ignored. It is especially unusual to have a primer with a VOC content less than the subsequent coatings likely to be applied over the primer.

Response: Your December 6, 1999, letter was addressed in the bituminous roof coatings write-up in Appendix D. Letters that were sent during the comment period last June were addressed in Appendix C. All other letters were addressed in the category descriptions in Appendix D.

In addition, it appears that you misunderstood our proposal. In our December proposal, bituminous roof primers were included in the bituminous roof category. Accordingly, bituminous roof primers had the same limit, 250 g/l, as bituminous roof coatings. At the time of that proposal we were still working with the Roof Coatings Manufacturers Association (RCMA). RCMA has subsequently provided substantial data showing that a higher limit is needed for colder climates and which supports creating a new category for bituminous roof primers with a limit of 350 g/l, due to climate and viscosity issues present outside of the South Coast Air Basin. This limit is the most common current district limit for primers, sealers, and undercoaters and has been in existence for about ten years. There are water-based and solvent-based products that meet this limit and they represent 57 percent of the current market share. In addition, we are proposing a 300 g/l limit for bituminous roof coatings based on similar data. This is the most common current district limit and 98 percent of the bituminous roof market share complies with it.

6-2. Comment: With respect to the VOC limitations in the category of bituminous roof coatings the proposed 250 g/l limitation is precisely half of the limitation permitted in the recently adopted national EPA rule (500 g/l). In addition, it is substantially below the current 300 g/l limit, which I believe is your current regulation. Reducing the VOC content in this particular line of product will result in a coating likely to be brittle and lacking flexibility normally associated with bituminous roof coatings. It will result in the application of a thicker film which would defeat the intent of lowering VOCs because more will be applied to the surface.

Response: We are proposing to set a limit of 300 g/l for bituminous roof coatings, due to issues with viscosity in low temperature areas outside of the South Coast Air Basin. Please see response to Comment #6-1 of the Final Program EIR.

6-3. Comment: I don't believe our industry has done a very good job with respect to explaining the use of bituminous primers in the application of a wide variety of roof systems. This particular material is most often specified for conformance with ASTM D-41. In order to conform to that ASTM designation most asphalt primers would probably require a minimum VOC content of 480-500 g/l. As the former chairman, and the current vice chairman of the ASTM sub-committee responsible for this particular standard I can tell you very honestly that this ASTM sub-committee has not been able to devise an asphalt primer standard that would satisfy your proposed low VOC requirements.

Here, also, trying to reduce the solvent content and develop a replacement to satisfy your proposed regulation would result in the application of a heavier film of product resulting in more solvent applied per square foot. In addition it would probably mean that the dry time for the primer would be delayed and that would result in an open and unprotected roof for an unreasonable and dangerous period of time.

The bottom line is that we are asking you to establish within your bituminous roof coatings category an exception for bituminous roof primers, which should be permitted to have a VOC content of 500 grams per liter.

Response: Bituminous roof coatings are maintenance coatings and are applied to form a sacrificial layer of protection over the top of the main waterproofing structure. From our discussions with manufacturers, the dry time for bituminous primers varies by product and ranges from one to 24 hours to dry for solvent-borne products and one hour to five days for water-borne products. Both water-based and solvent-based products can dry in short periods of time and are dependent upon the temperature and humidity.

Districts currently regulate bituminous primers under their primers, sealers and undercoaters category, which has a VOC limit of 350 g/l. This limit has been in effect for this category for about ten years. At the time of the release of the Draft Program EIR, we were still waiting for additional documentation to support industry’s claims. RCMA and the manufacturers have worked to provide us information on the issues associated with bituminous roof primers and bituminous roof coatings. We have reviewed the data on the minimum requirements of viscosity for brushing and spraying and the VOC content curves over temperature and viscosity plots.

We are proposing a VOC content limit of 350 g/l statewide. In areas with climate similar to that in the South Coast Air Basin, lower VOC limits are possible. According to the industry data provided, the proposed limit of 350 g/l will address the dry time, viscosity, and coating thickness issues present in areas with colder and more humid climates than those present in the South Coast Air Basin.

An additional option for reformulation is the use of exempt solvents. The commenter mentions only one formulation option present to manufacturers, namely, the reduction of solvent and increase of solids. Other manufacturers have bituminous roof primers that meet the 350 g/l limit, which show that reformulation options exist and are being sold in a significant quantity.

Based on our survey data and the additional data provided by the RCMA, approximately 57 percent of the market currently complies with the proposed limit of 350 g/l, and includes both solvent-based and water-based bituminous roof primers. We believe that it is inappropriate to raise a limit, which has existed for almost ten years and has over half of the market complying.

COMMENT LETTER #7
FSC Coatings, Inc.
March 13, 2000

The commenter has attached and incorporated by reference a previously submitted comment letter dated November 20, 1999, as well as an outline and binder from a meeting with ARB staff. Responses are provided for all attachments.

7-1. Comment: The commenter requests responses to comments made in a letter dated November 1999, an outline from a meeting with ARB staff in September 1999, and a notebook forwarded in January 2000 containing information on coatings of concern.

Response: The individual categories of concern to the commenter are: industrial maintenance coatings, rust preventative coatings, floor coatings, stains, anti-graffiti coatings, lacquers, and varnishes. These comments will be addressed individually in responses to Comments #7-5, #7-7, #7-8, #7-9, #7-10, and #7-11 of the Final Program EIR.

7-2. Comment: The commenter requests review of the current method of calculating VOC and changes to include the exempt solvent inside the calculation equation. The current method of calculating VOC is unfair to exempt solvents, and penalizes manufacturers for doing what the ARB wants manufacturers to do. The VOC calculation method should be changed to include exempt solvents in the calculation to benefit the manufacturer who uses environmentally friendly solvents. By using high percentages of exempt solvents in our products, the current VOC calculation method yields an artificially high value in comparison to the actual VOC used. It is misleading as to what has been done to lower VOC emissions, and is particularly important to water-borne systems, metal maintenance systems, urethanes and epoxies, acrylic lacquers for sealing masonry, and high solids, quick dry varnishes.

Response: The commenter refers to the formula for calculating VOC content in subsection 6.1 of the proposed SCM in which the labeled VOC is determined by excluding the volume of any water and exempt compounds. The commenter is correct that in coatings containing a large amount of water or exempt solvent, the labeled VOC is considerably higher than the actual VOC in the can. The "less water and exempts" provision is used to provide an equivalent basis for comparing the polluting portion of solvent-based and water-based coatings, *i.e.*, on a solvent to solids ratio.

We can understand the commenter's frustration regarding this provision. However, this requirement has been included in district rules for many years and is required by the U.S. EPA in the National AIM Rule as well as in other types of federal rules. We discussed the possibility of changing this provision to conform to the commenter's ideas at two workshops. The feedback at the first workshop was that if California districts had a different VOC labeling provision than required by the National Rule, all products would have to be relabeled, which would result in enormous cost to the industry. At the second workshop, commenters said that such a provision would be attractive if a long phase-in period for labeling accompanied it. However, we did not pursue the direction from the second workshop because districts would likely have problems with the approvability of their architectural coatings rules as State Implementation Plan (SIP) revisions by the U.S. EPA, which means that districts would not be able to claim the emission reductions from the rule. This commenter and others who are concerned about this issue are encouraged to express these concerns to the U.S. EPA, as well as at the State and local level. Nevertheless, we will continue to explore this approach in the future.

7-3. Comment: The commenter expresses appreciation for the willingness of ARB staff to consider alternative solutions to issues raised by the commenter. The commenter expresses hope that the result of this cooperation will result in a more balanced rule, with environmental benefits, lower costs to the end user, and enhanced system performance.

Response: The ARB staff appreciates this comment, and shares the commenter’s expectations regarding the benefits of the rule.

7-4. Comment: The commenter believes that his suggestions in subsequent comments are valid and will help achieve the goal for cleaner air.

Response: The comment is noted.

7-5. Comment: (a) Air dry, single-component coatings are simpler, more likely to be applied in accordance with the manufacturer’s instructions, and would result in less waste, compared with two-component coatings. The single-component coatings also adhere better to surfaces with less than perfect surface preparation.

(b) There are problems with two-component, mix-at-the-tip epoxy coatings, because of variations in adhesion and the reactivity of the coatings before they reach the steel substrate, preventing penetration into the surface.

(c) Problems with 90 to 100 percent solids coatings include additional costs and poor repairability.

(d) The two-component coatings require deeper abrasive blast patterns for surface preparation, greater use of sand, and creation of hazardous residues. This creates more pollution and additional costs. Few workers are capable of handling two-component coatings.

Response: (a) We concur that the traditional alkyd coatings may be easier to use, more tolerant of less than perfect surface preparation, adhere better to these poorer surfaces, and result in less waste. That is the reason the “rust preventative” coatings category is included in the SCM. That category is intended for non-industrial users (*i.e.* residential, commercial, and institutional users) with minimal skill, such as “do-it-yourselfers” and general painting contractors for houses, businesses, and institutions. Most of the alkyd coatings in the “rust preventative” category are in the range of 300 to 400 g/l. The VOC limit in the SCM is 400 g/l and is the same as the national limit already in effect.

For the industrial maintenance category, higher-skilled professionals/contractors are available for applying both single and two-component industrial maintenance coatings. Currently, both high and low-VOC coatings are being used by these higher-skilled industrial workers, who should be able to apply various types of industrial maintenance coatings that comply with the proposed SCM. Proper and thorough surface preparation is crucial to the performance of high-performance industrial maintenance coatings. Industrial workers have the equipment and skill for using various surface preparation options, such as abrasive blasting.

(b) Generally, two-component coatings are manually premixed in a container shortly before application, rather than automatically mixed near the spray tip of the spray apparatus as the coating is being applied. Premixing inherently does not have the potential for dynamic mixing variations with “plural” component spray equipment that mechanically mixes the components near the spray tip. The main considerations with premixing include following the appropriate mixing procedure, notably using the proper ratio of components, and working within the “pot life” of the coating mix. With proper surface preparation, epoxy coatings are among the best for adhesion to surfaces, including steel substrates.

(c) Generally, the very high solids, industrial maintenance coatings are used for extreme conditions when the higher costs and more effort for coating repair are warranted. Since the coatings are designed to withstanding severe use, there should be less frequent damage to the coating itself, and hence less frequent need for coating repair.

(d) Generally, two-component coatings, both high-VOC and low-VOC, are currently used for severe condition or “heavy-duty” uses when the more thorough surface preparation requirements and higher costs are warranted. We anticipate that for the less severe (“light-duty” and “medium-duty”) uses, water-based industrial maintenance coatings, such as single-component acrylic coatings, will be used to a greater extent. We also anticipate that the surface preparation requirements and costs of coatings for “less severe” uses will be slightly greater, but not substantially greater, than with traditional alkyd coatings. Generally for any type of coating, the extent of surface preparation needed is related to the level of performance needed. For the future, we believe that efforts are underway to develop water-based alkyd coatings that will comply with the proposed 250 g/l limit for industrial maintenance coatings.

Since two-component coatings are already being used for severe condition uses, we anticipate that the amount of sand used in the future for abrasive blasting would not substantially increase. For the “less severe” uses, we anticipate that two-component coatings will be minimally used as replacement coatings, since single-component coatings are available. Therefore, we anticipate that the amount of sand would minimally increase for the “less severe” uses. Air emissions and the types of waste generated from outdoor abrasive blasting in California are already regulated by the ARB. The human health aspects of abrasive blasting has been addressed in the Draft Program EIR, page IV-112.

The issue of architectural and industrial maintenance coating “waste” has been addressed in the Draft Program EIR, pp IV-101 through 103. We have determined that, with the proposed SCM, the total amount of solid waste and hazardous waste material deposited in California’s landfills will not create a significant solid waste or hazardous waste impact. No mitigation measures are required.

Regarding skills that industrial maintenance workers need, see response part (a) of this comment above.

7-6. Comment: Air-dry coatings use renewable resources.

Response: While some traditional solvent-based, high-VOC coatings may contain certain renewable constituents, the coatings are generally far from being totally renewable. For example, alkyd coatings may be formulated with vegetable-oil-derived alkyd resins, from vegetables produced by commercial farming using mechanized operations, pesticides, and fertilizers that may be associated with petroleum or natural gas. The traditional coatings also use substantial quantities of solvents, which are generally petroleum-based. Water-based coatings use water, which is also a renewable resource.

7-7. Comment: Single-component, solvent-based coatings provide health benefits, since they do not have the “body tissue reactive components” of two-component coatings.

Response: Industrial workers have available professional-grade protective gear, including protective clothing and respirators, to minimize the health hazards when applying industrial maintenance coatings. The Draft Program EIR, pages IV-108 through 120, discussed potential human health impacts. We have determined that human health impacts are not significant and mitigation measures are not required. Low-VOC coatings also inherently provide the health benefits of lower VOC emissions into the air, the main purpose of the proposed SCM.

7-8. Comment: Description of acrylic lacquer sealers for concrete, masonry, and aggregate surfaces. The commenter requests an SCM limit of 550 g/l for such products.

Response: Our current proposal is to include a waterproofing concrete/masonry sealer category for these products with a limit of 400 g/l. (See response to Comments #2a-1 and #2b-1 of the Final Program EIR.) The most common current district limit for these coatings is 400 g/l, which our proposal maintains.

7-9. Comment: This comment appears under the heading of floor coatings and is in outline format only. Supporting documentation is incomplete, only one of the indicated attachments (#4) was submitted and it concerned antenna coatings. The commenter is requesting a limit of 350 g/l.

Response: Although the comment is quite vague, staff would like to point out that the proposed VOC limit for floor coatings has been modified to 250 g/l. The most common current district limit for floor coatings is 250 g/l (default limit). Our proposal maintains that limit, for which there is an 85 percent complying marketshare. For floor coatings used in industrial settings, the limit is also 250 g/l, which is lower than the most common district industrial maintenance limit of 420 g/l. However, there are many compliant industrial maintenance floor coatings at this limit and lower. Also, for metal non-industrial substrates, there are rust preventative coatings at 400 g/l, and waterproofing concrete/masonry sealers at 400 g/l for these types of surfaces. (See the response to Comment #4b-22 of the Final Program EIR.)

7-10. Comment: The comment appears under the heading of wood stains. A number of articles are presented regarding wood preservative use on log homes, and on wood shakes and shingles. Also presented are various data sheets and product comparisons for the commenter's line of wood preservatives/stains called "Total Wood Preservative (TWP)." The commenter requests a 350 g/l limit.

Response: It should be noted that wood preservative and stains are two separate coatings categories with different VOC limits recommended for each. The TWP-200 product has a VOC content of less than 50 g/l and is recommended for roofs, siding, fencing, and log homes. The VOC content of the other two products for which data sheets are provided is 350 g/l, both are recommended for decks, one for furniture. Although two of these three products would not currently comply with a 250 g/l limit, one product would. Also, per Section 3.2 of the SCM, wood preservatives that are also stains would be allowed to meet 350 g/l.

7-11. Comment: The SCM should propose a VOC limit of 550 g/l or higher for high performance anti-graffiti coatings because: (1) low solids systems are more chemical resistant and have higher color retention; (2) these coatings are used in low volumes; and (3) these coatings are used mostly by schools and governments.

Response: While we agree that the volume of antigraffiti coatings sold is relatively small, and that these coatings are used by schools and governments, we disagree that a 550 g/l VOC limit is appropriate. As stated in the analysis of antigraffiti coatings in Appendix D the Draft Program EIR, we are aware of numerous antigraffiti coatings, both permanent and sacrificial, that are below the VOC limits proposed in the SCM (specifically, permanent antigraffiti coatings would generally qualify as industrial maintenance coatings with a 250 g/l VOC limit, while sacrificial antigraffiti coatings would fall under the general flat or nonflat coatings limits of 100 and 150 g/l, respectively).

The commenter mentions that low solids (presumably higher VOC coatings) have better chemical resistance and color retention. However, the commenter provided no information to substantiate these claims, and did not clarify the level of solids he considers as “low.” In addition, we note that the solids level of the commenter’s antigraffiti product, 2-605 Graffiti Max, is very similar to the solids levels of some of the complying products cited in the Draft Program EIR. For example, the product data for 2-605 Graffiti Max lists the volume solids to be 41.5 percent. This compares to 40-46 percent solids for Armaglaze WB 6000, a low-VOC product cited in the Draft Program EIR. Finally, with regard to the commenter’s statement that low solids products have better chemical resistance and color retention, the commenter cited an article that he wrote entitled “The A-B-C’s of Graffiti Control,” in which he describes a product called “Graffiti No More” that is “tremendously effective,” and is available “as paint…with a very high solids content ranging from 50-55%….” The article also warns against the use of inferior antigraffiti products that are “very low solids” and “lower grade, low solid acrylic urethanes.”

Comments and responses regarding a binder sent to ARB by FSC Coatings December 22, 1999

7-12. Comment: The ARB is not considering the performance of replacement coatings, life-cycle costs, emissions associated with more frequent recoating, and costs of lost business to other states and other countries with less stringent emission standards.

Response: We have considered all of these issues. Data from the NTS and Harlan Associates studies show that, in general, the performance of high and low-VOC coatings are similar. The Draft Program EIR, pages IV-70 and 71, discussed the issue of “more frequent recoating.” We concluded that, in general, low-VOC coatings are as durable and as long lasting as traditional solvent-based coatings, and thus more frequent recoating is not necessary.

We have determined that the basic market demand for various coating uses will be met by coatings that comply with the proposed SCM. Our cost analysis indicates minimal cost increases. Architectural coatings are coatings applied to facilities and infrastructure that is in place and does not move. Current California industry and other infrastructure will continue to need industrial maintenance coatings. Thus, the basic demand for industrial maintenance coatings will not change.

We anticipate that other states and countries may benefit, in terms of less solvent exposure and improved air quality, from the lead efforts that much of California is anticipated to take with the proposed SCM.

7-13. Comment: Air-dry phenolic alkyd coatings are superior maintenance coatings for above grade and above waterline applications. Information regarding “Zero-Rust” primer coatings, “SA-3 Silicone Alkyd” topcoat, “SA-3 Silicone Poly Plus” topcoat, test results, and user experiences are provided.

Response: We appreciate receiving information regarding these coatings. The proposed limit for the “rust preventative” category is 400 g/l, and for the “industrial maintenance” category is 250 g/l. As discussed in the Draft Program EIR, we believe that reformulation options are available for coatings to comply. Data from the NTS and Harlan Associates studies show that, in general, the performance of high and low-VOC coatings are similar.

Some of the provided information concern coatings for Navy ships. The proposed SCM does not pertain to coatings for ships, and will not affect the VOC content of those marine coatings.

COMMENT LETTER #8a
Henry Company
March 10, 2000

8a-1. Comment: We do not believe that functional asphaltic primers can be formulated at the proposed VOC limits. The key performance requirements are to use a compatible asphalt and to have a low viscosity at low temperatures. Reducing the VOC content of the primer rapidly increases the viscosity, especially at cold temperatures. Keeping the viscosity at even semi-acceptable levels requires reducing the quality of the asphalt, transitioning from pure air-blown roofing asphalt to blends with softer asphalts and perhaps asphaltic oils. Changing the bitumen this way prolongs the drying time and eventually creates a surface, which is incompatible with the coating, thus causing coating failures. Primers with a viscosity at the application temperature below ~200 – 400 centipoise are acceptable. High viscosity makes the coating more difficult to apply and leaves a heavier applied film. This adds more solvent to the surface, delays the job by prolonging the dry time of the primer, and may contribute to the functional problems seen with some of the low-VOC primers.

Response: We have worked with the Roof Coating Manufacturers Association (RCMA) and several manufacturers to address bituminous primers. At the time of the release of the Draft Program EIR, we were still waiting for additional documentation to support this industry's claims. RCMA and the manufacturers have worked to provide us information on the issues associated with bituminous roof primers and bituminous roof coatings. We have reviewed the data on the minimum requirements of viscosity for brushing and spraying and the VOC content curves over temperature and viscosity plots. We believe that the VOC content should be 350 g/l for areas outside of the South Coast Air Basin, due to climatic conditions. Therefore, we are proposing to raise the limit to 350 g/l for bituminous roof primers. Districts currently regulate bituminous primers under their primers, sealers and undercoaters category, which has a VOC limit of 350 g/l. This limit has been in effect for this category for about ten years. Based on our survey data and the additional data provided by the RCMA, approximately 57 percent of the market can comply with the proposed limit of 350 g/l, and includes both solvent-based and water-based primers.

8a-2. Comment: The only "non-ozone depleting" exempt solvent in Section 2.57 into which asphalt will dissolve is parachlorobenzotrifluoride, sold under the trade name Oxsol® 100. This solvent presents some problems if used in a roofing primer. The solvent has an offensive odor – a combination of toluene and mothballs. The solvent is extremely expensive, roughly $30 per gallon in drums. [I don't believe that anyone makes enough asphalt primer to be able to dedicate a new solvent tank to the product.] A gallon of primer at the proposed limits will require ~1/2 gallon of exempt solvent, which will increase the cost of the material by more than a factor of 10.

Response: Exempt solvents represent one way to comply with the limit. Manufacturers that decide to use Oxsol in their primers may use them in their bituminous roof coatings as well. Hence, the tank could be used for both categories over the span of their bituminous roof product line, which may also include their aluminum bituminous roof coatings. Aluminum bituminous roof coatings, which meet the definition of metallic pigmented coatings are regulated under the metallic pigmented coatings category. Nevertheless, the proposed limit of 350 g/l is the current limit in many districts, and there is a high compliance rate with this limit without the use of Oxsol, so this should not be a concern.

COMMENT LETTER #8b
Henry Company
March 13, 2000

8b-1. Comment: As we discussed in our meeting with CARB staff on January 18, 2000, solvent-based bituminous roof coatings provide a vital part of roof maintenance which cannot be replaced by water-borne coatings. The VOC limit for such coatings in the proposed SCM is not adequate to permit a coating, which can be applied at the low temperatures commonly found throughout the state. Because of weather limitations, water-borne (emulsion) roof coatings are not a substitute for solvent-borne coatings in many parts of the state for much of the year.

Response: Based on our research and the information provided by the RCMA, water-based coatings are, in general, used from April through October. In areas like the South Coast, solvent-based and water-based coatings may be used year round, due to the unique climate in southern California. Contractors choosing to use solvent-based coatings will not experience the issues discussed above and water-based coatings can be used more often due to the ambient temperature and the amount of precipitation. However, in areas that experience much colder winters and increased precipitation, solvent-based roof coatings are necessary. Therefore, we are proposing a limit of 300 g/l for the non-South Coast AQMD areas of the state.

8b-2. Comment: *Water-based Coatings.* Because they are water dispersions, water-borne bituminous roof coatings must be allowed to cure completely before being exposed to precipitation. Low temperatures and evening dew can prolong the cure of the coating substantially. For this reason they are typically applied only where warm, clear weather is predicted. Our recommended weather envelope is 50 ^{o}F and rising, with no dew, precipitation, or temperatures below 40 ^{o}F for 48 hours. These requirements leave much of California outside the safe application window for much of the year.

Solvent-based Coatings. Solvent-based coatings can be applied at almost any temperature. Since they are not water sensitive, they can be applied in cold weather and trusted to finish their cure without concern for the weather. They can be applied just before a rainfall if necessary. For these reasons, solvent-borne coatings are often used to effect emergency repairs of weathered roofs.

Reducing the VOC content of a solvent-borne bituminous coating rapidly increases the viscosity, especially at cold temperatures. It is our experience that a roof coating can not be applied by brush (the usual method for solvent-borne coatings) if the viscosity is above ~80,000 centipoise.

Response: Please see the response to Comment #8b-1 of the Final Program EIR.

COMMENT LETTER #9a
The Sherwin-Williams Company
March 24, 2000

9a-1. Comment: The commenter is submitting a number of product data sheets and material safety data sheets to correct a number of errors related to Sherwin-Williams products in Appendix E of the Draft Program EIR.

Response: We appreciate the corrected information and have incorporated it into the tables.

9a-2. Comment: Table E-8, Floor Coatings, includes a safety and zone marking latex paint listed as a floor coating. This product is clearly not a floor coating.

Response: The comment is noted. Table E-8 has been corrected.

9a-3. Comment: Table E-2, Lacquers from 550 to 680 g/l, includes two coatings which are labeled for Industrial Use Only (Original Equipment Manufacturer Use) and are not for field application.

Response: We have removed these coatings from Table E-2.

9a-4. Comment: Table E-3, Lacquers < 550 g/l, includes a lacquer and a polyurethane product which are labeled for Industrial Use Only and are not for field application.

Response: Table E-3 has been updated.

9a-5. Comment: The text in the corresponding category discussions should be modified in accordance with the specified corrections made to the VOC contents of some flat and non-flat products. Specifically, the claim for "low temperature application to 35^o F" should be deleted in the list of properties found for complying flat coatings and the associated discussion should be modified unless there are other complying coatings that make the same claim. Also, the claim for "alkyd-like flow and leveling" should be deleted in the list of properties found for complying non-flat coatings and the associated discussion should be modified unless there are other complying coatings that make the same claim.

Response: The claim for "low temperature application to 35^o F" was not unique to the specified Sherwin Williams product, so no changes were needed for the corresponding text in the flat category discussion. The text in the non-flat category discussion has been corrected.

9a-6. Comment: The commenter submitted corrections to the VOC contents of the following Sherwin-Williams products listed in Appendix E of the draft EIR: EverClean Latex Interior Flat, Low Temp 35 Latex Exterior Flat, ProClassic Waterborne Acrylic Semi-Gloss, ProClassic Waterborne Acrylic Gloss, ProMar 200 Interior Latex Gloss Enamel, SuperPaint Exterior High Gloss Latex, EverClean Interior Satin, LowTemp 35 Exterior Satin House Paint, A-100 Line-Satin, A-100 Line-Gloss, ProClassic Waterborne Acrylic Gloss, and ProMar 200 Latex Gloss Enamel. Also, the ProMar 200 Latex Gloss Enamel does not meet the gloss criterion of a quick-dry enamel and should not be listed under that category.

Response: The corrections have been made to the tables.

9a-7. Comment: An error was found in the product data sheet for the Sherwin-Williams "Tank-Clad™ HS Epoxy (B62-80 series)" coating. The VOC content listed as 177 g/l should be corrected to be 249 g/l (catalyzed and reduced 10 percent).

Response: The comment is noted, and we have corrected the Appendix E table accordingly in the Final Program EIR.

9a-8. Comment: There are corrections needed to the VOC content of the following Sherwin-Williams products listed in Appendix E of the Draft Program EIR: Loxon® Exterior Acrylic Masonry Primer, PrepRite™ 400, and PrepRite™ 200.

Response: Thank you for submitting the corrected information. The appropriate corrections have been made to Appendix E of the Draft Program EIR.

9a-9. Comment: An error was found in the product data sheet for S-W Cuprinol® Clear Deck Sealer. The VOC content listed in Table E-25 as 27 g/l should be corrected to be 287 g/l.

Response: The comment is noted, and the correction has been made.

COMMENT LETTER #9b
The Sherwin-Williams Company
April 7, 2000

9b-1. Comment: In earlier discussions and meetings with industry the ARB seemed committed to developing an averaging provision for the SCM, but the Draft Program EIR states that the ARB will not be including such a provision with the current proposal. The Draft Program EIR notes that there are difficulties in developing such a program, but the ARB has not held additional meetings needed to discuss and resolve these difficulties. Without an averaging provision the proposed SCM is more restrictive than SCAQMD 1113, the only district in the country ranked as severe for ozone nonattainment by the U.S. EPA. The ARB should postpone the hearing on the proposed SCM until an averaging program can be developed.

Response: Although the proposed SCM does not currently include an averaging provision, we are currently working with interested parties to develop such a provision to be presented at the June 22, 2000, Board meeting. Please see the response to Comment #1-2 of the Final Program EIR.

9b-2. Comment: The proposed SCM would prohibit the use of "rust preventative coatings" for industrial maintenance, even when a rust preventative coating meets the 250 g/l VOC limit of the industrial maintenance category. Rust preventative coatings meeting the 250 g/l limit should be allowed for industrial maintenance use, since there would be no difference in emissions. Section 3.7 should be changed back to the wording in the December 1, 1999 version of the proposed SCM:

> Rust Preventative Coatings: Effective January 1, 2004, no person shall apply or solicit the application of any rust preventative coating for industrial use, unless such a rust preventative coating complies with the industrial maintenance coatings VOC limit.

Response: We concur and have revised the proposed SCM as recommended.

9b-3. Comment: Section 3.3 of the SCM needs to be modified to allow the use of coatings manufactured prior to the effective date of the rule, for an indefinite period of time. As written, after the rule's effective date, the product would not be allowed to be used, and would need to be disposed of as hazardous waste.

Response: The requested change has been made to the proposed SCM.

9b-4. Comment: The description of floor coating category states "a variety of high performance clear or opaque coatings." However, the SCM definition states "An opaque coating…" We consider it critically important to only include opaque coatings in this category.

Response: The commenter has taken the language regarding "a variety of high performance clear or opaque coatings" out of context. This language is not being used to describe the SCM floor coatings category, rather, it is used in describing the common meaning associated with the use of the term "floor coating." The category description clearly states that for the purposes of the SCM category, floor coatings are opaque only.

9b-5. Comment: The commenter recommends dividing the floor coating category into two sub-categories, one for residential application and the other for commercial and industrial applications.

The commenter believes multi-component systems inappropriate and too hazardous for nonprofessional application in residential settings. Such products are marketed as part of their industrial maintenance product line and are not recommended for nonprofessional users. The Product Data Sheet and MSDS for a specific example product are referenced. It is stated that "In no way does the Product Data Sheet indicate a residential use." To contrast this type of product information, the Product Data Sheet and MSDS are referenced for their Acrylic Latex Floor Enamel that is intended for use by nonprofessionals in residential settings. The commenter believes it is obvious from the data sheet that this product is recommended for residential uses, such as floors, steps, concrete, wood, and steel, and that the product can easily be applied in a safe manner.

Response: Staff does not believe it is necessary to divide this category into two sub-categories. Staff has however modified the proposed limit for this category. The proposed higher limit of 250 g/l will address this concern. (See response to Comments #4a-3 and #4b-22 of the Final Program EIR.)

9b-6. Comment: Appendix E lists only two floor coating products that are not multi-component coatings which might be considered appropriate for residential use. Of these, one is not a floor coating. This leaves only one product included in the EIR that is appropriate for non-professional use in residential settings which could comply with the proposed limit.

An evaluation of three other products is presented in support of the commenter's belief that most, if not all, coating manufacturers consider multi-component coatings for use only by professionals.

Response: The commenter is correct that one of the products listed is not a floor coating. The error has been corrected.

Although staff agrees that there are certain types of multi-component coatings (such as urethanes containing free isocyanates) which would be considered inappropriate for non-professional use in residential settings, not all multi-component coatings require such use restrictions (e.g., epoxies). Staff also believes that the availability of various multi-component coatings for purchase by non-professional consumers demonstrates that not all manufacturers agree with the commenter regarding appropriate use of such products. However, the proposed limit has been increased to 250 g/l which has resulted in more complying single component products. (See response to Comments #4-3 and #9b-5 of the Final Program EIR.)

9b-7. Comment: At the 3/16 Workshop, staff mentioned they had found additional floor coatings that would meet the proposed 100 g/l limit and which would be appropriate for residential use. A table that outlines information provided for specific products and the commenter's concerns with those products is included.

Response: At the workshop, staff indicated they had found additional products relevant to the recommended floor coatings limit, some of which have VOC contents above 100 g/l. Following are brief summaries of the commenter's concerns with specific products and staff's responses to these concerns:

Seal-Krete Skid-Proof EZ Coat
Concerns: Neutral in color, not opaque, as such does not qualify as a floor coating. Recommends mixing by mechanical shaker to add color, mixing equipment not found in most residential settings. Recommends etching with muriatic acid followed by surface pH neutralization, not activities typical of residential users. Recommends two coats after application of a sealer.

Response: Prior to tinting, product is tan in color, and as such does qualify as a floor coating. Mixing of tint into product by mechanical shaker is something done at the time of purchase by the seller. Acid etching, pH neutralization, and sealer/primer application are all common recommendations associated with floor coatings; the data sheet for commenter's very own product (Acrylic Latex Floor Enamel) which is recommended for non-professional users in residential settings recommends all three of these surface preparations.

Seal-Krete Proformance Skid-Proof
Concerns: In addition to the same concerns mentioned above regarding color and product mixing, application is by trowel, spray hopper or larger textured sprayer, such equipment is not familiar to non-professional users. Product provides limited coverage.

Response: Although non-professional users may not be familiar with using a trowel to apply floor coatings, staff believes that the use of a trowel for other purposes by non-professionals is common practice and should not present a problem for most users. Many floor coatings are designed as high build products, and as such, these products do provide limited coverage.

Seal-Krete Commercial Floor Sealer
Concern: This product is a clear sealer and does not meet the definition for a floor coating.

Response: The commenter is correct, this product is not a floor coating by definition and does not appear in the tabular listing for this category. The information was provided in response to concerns raised by the commenter at the workshop regarding the availability of primers that are part of a recommended system.

Snow Roof Safe-T-Kote
Concerns: Recommended for roofs and thus does not qualify as a floor coating. MSDS states that an eyewash and safety shower should be nearby and ready to use, neither of these is available in residential settings.

Response: The data for this product clearly describes a floor coating recommended for use on stairways, walkways, wheelchair ramps, porches, patios, and decks. Staff believes the availability of residential faucets, sinks and showers adequately address the MSDS safety considerations for such settings.

Snow Roof Safe-T-Prime
Concern: This product is a primer and does not meet the definition for a floor coating.

Response: The commenter is correct, this product is not a floor coating by definition and does not appear in the tabular listing for this category. The information was provided in response to concerns raised by the commenter at the workshop regarding the availability of primers that are part of a recommended system.

Jasco Stop Slip
Concerns: Information provided is handwritten note on a copy of Jasco's internet homepage indicating the availability of the new product with 32 g/l VOC content. No other information appears available. Rule making should not be based on such flimsy information.

Response: This product is available from Home Depot stores in the Sacramento area. The VOC content provided commenter was obtained by staff from the manufacturer in response to our e-mail request for information. The manufacturer does not currently have a product data sheet available for this new product but has provided a MSDS pursuant to staff's request.

Sherwin-Williams Armorseal 1000 HS
Concerns: The product is an industrial maintenance and marine coating. The recommended uses for this product which appear on the label are not floors. The label states, "Not for Residential Use" and "For Professional Use Only."

Response: The product is marketed as an industrial maintenance coating. The product label also clearly classifies the product as a "HEAVY DUTY FLOOR COATING" and includes concrete floors in the list of recommended uses. U.S. EPA's National AIM Rule requires labels on industrial maintenance coatings to include descriptions such as "Not for Residential Use" and "For Professional Use Only." This is only a labeling requirement, there are no restrictions to use. As indicated previously, staff has found industrial maintenance coatings, including this product, to be readily available to the general public.

Litex 2-Part Epoxy Waterbased Floor Coating
Concerns: Two-component epoxy – not appropriate for non-professional users. Very little information provided, including no VOC information, no MSDS.

Response: Staff does not agree that two-component epoxy products are not appropriate for non-professional users. This product is available at major home improvement centers in the Sacramento area. Product literature indicates easy application with brush or roller to wood, asphalt, masonry, and concrete with no acid etching required. VOC content reported on label is 209 g/l. MSDS is available.

Litex 2-Part Epoxy Waterbased Rubber Floor Coating
Concerns: Two-component epoxy – not appropriate for non-professional users. Very little information provided, including no VOC information, no MSDS. Seems to be recommended for concrete surfaces, not for general purpose, wood porches, *etc.*

Response: Staff does not agree that two-component epoxy products are not appropriate for non-professional users. The product is recommended for concrete only.

Litex 2-Part Epoxy Waterbased High Gloss Clear
Concern: This is a clear coating, and thus does not meet the definition of floor coating.

Response: Commenter is correct, this product does not meet the definition of a floor coating. Product does not appear in the tabular listing of products for this category.

Litex 2-Part Epoxy Waterbased Concrete Stain
Concern: As a stain, this is not opaque and thus is not a floor coating.

Response: Stains can be opaque, and thus can be considered floor coatings. The product literature does not specify whether this product is opaque or semi-transparent. This product has not been included in the tabular listing of products in this category.

Epoxi-Tech Epoxy Shield
Concern: This claims to be a garage floor coating, nothing else. Very little information provided, including no VOC information, no MSDS.

Response: Product is marketed as a concrete garage floor coating. The VOC content reported on the label is 250 g/l maximum. This product is available at major home improvement centers in the Sacramento area. MSDS is available.

9b-8. <u>Comment</u>: With all the data accumulated by ARB, only one floor coating product that would be appropriate for use by non-professionals in residential settings was found with a VOC content to comply with the proposed 100 g/l limit. This is an inadequate basis for establishing a limit that will essentially require residential users to be exposed to hazardous chemicals.

Response: Staff has found more than one currently available product that meets the originally proposed limit of 100 g/l. Staff does not agree with the commenter's conclusion regarding residential users being exposed to hazardous chemicals (see response to Comment #9b-6 of the Final Program EIR.) Although staff believes a 100 g/l limit for floor coatings is achievable by technologies other than epoxy or polyurethane, the proposed limit has been modified to 250 g/l. There are several reasons for this increase in the proposed floor coatings VOC limit (see response to Comment #4b-22 of the Final Program EIR).

9b-9. Comment: The commenter recommends that the floor coating category be divided into two sub-categories, one for industrial and commercial use and one for residential use, with VOC contents of 100 and 250 g/l respectively. They also recommend definitions for single component and multi-component floor coatings.

Response: The originally proposed limit for floor coatings has been modified to 250 g/l. With this proposal there is no need to divide the category or create new definitions (see response to Comment #4b-22 of the Final Program EIR).

9b-10. Comment: The primers and undercoaters recommended by the Sherwin-Williams Company for use on wood and composition board under all exterior latex coatings are consistently solvent-borne with a VOC content of 350 g/l. We have reviewed all the Sherwin-Williams product data sheets and have found only one product line where a latex primer is recommended: the LowTemp 35™ product line recommends the LowTemp 35 ™ Exterior Latex Primer for application over wood and composition board. However, since this is a unique system, we do not generally recommend this primer for use on wood and composition board under our other exterior latex coatings. Product data sheets for all of the exterior latex systems are enclosed.

We want to stress that the concerns with wood and composition board are not limited to stains bleeding through the substrate. While that is a significant problem with water-borne coatings on certain woods (*e.g.* redwood, cedar, *etc.*), it is less of a problem with composition board. However, composition board frequently has a wax-type of material bleeding out. Unless sealed by a solvent-borne primer, this wax will appear as unsightly dark patches on the finish. We recommend the following category be added with a 350 g/l limit:

> Exterior wood primer, sealer, and undercoater: A primer, sealer, or undercoater formulated and recommended for use exclusively on exterior wood.

Response: Review of the product data sheets provided for the exterior latex systems confirms that the LowTemp 35 ™ Exterior Latex (Flat and Satin) product data sheets recommend use of LowTemp 35 ™ Exterior Latex Primer. Review of the provided product data sheets for other Sherwin-Williams exterior latex coatings also indicated that they have exterior latex coatings recommended for use on wood surfaces that are self-priming (Duration ™ Exterior Latex Flat Coating K32 Series and Duration ™ Exterior Latex Satin Coating K33 Series); and therefore do not require the use of a separate primer. Both Duration ™ products are at or extremely close to the VOC content levels proposed for the product categories to which they belong. All product data sheets submitted, with the exception of the LowTemp 35 ™ exterior latexes, specified the use of A-100 Exterior Latex Wood Primer over exterior plywood surfaces.

A review of Sherwin-Williams product data sheets for exterior primers indicates recommendations that differ from those provided on the product data sheets for their exterior latexes. For example, the product data sheet for A-100 Exterior Latex Wood Primer (VOC content of 123 g/l) indicates that it is “designed for use on exterior wood and plywood siding and trim as a spot primer or overall primer,” but the exterior latex product data sheets submitted make reference to using this primer over exterior plywood only. Because of the inconsistencies between recommendations made on exterior latex vs. primer, sealer, undercoater product data sheets, we assume that the information presented on the product data sheets for primers, sealers, and undercoaters, rather than those specified on exterior latex product data sheets, are correct use conditions for primers, sealers, and undercoaters. The A-100 Exterior Latex Wood Primer product data sheet indicates it may be topcoated by either an exterior latex or alkyd product, and there is no reference that would indicate it is not suitable for use on composition board.

The commenter makes reference to composition board, more commonly referred to as hardboard, and the problems resulting from wax bleed unless primed with a solvent-borne product. Further review of the commenter’s product data sheets indicate they have a latex primer recommended for use on exterior wood and hardboard that meets the proposed limit for primers, sealers, and undercoaters (PrepRite® ProBlock® Interior/Exterior Latex Primer Sealer).

Review of Pittsburgh Paints’ Technical Data Bulletin for Exterior Hardboard Latex Primer-Sealer 17-13 indicates that it “blocks wax migration that sometimes occurs when hardboard, particleboard, or similar surfaces are exposed to hot sunlight or high moisture conditions.”

In addition to those mentioned above, the following products, all of which comply with the proposed standard for primers, sealers, and undercoaters, have information on their product data sheets that indicates their suitability for exterior use over wood and/or hardboard substrates: 250 Acrylic Primer-Sealer All Purpose Primer for Exterior Concrete, Stucco, Hardboard, and Non-Staining Woods (Kelly-Moore Paint Company), Speedhide® 6-609 Exterior Latex Wood Primer (Pittsburgh Paints), SunCare™ 2-500 Exterior Latex Wood Primer (Pittsburgh Paints), M-P Prime Acrylic Multi-purpose Primer W 713 (Dunn-Edwards Corporation), Ultra-Hide Durus Exterior Acrylic Primecoat (ICI), Z-Prime II Universal Water-based Acrylic Primer-Sealer (Zehrung Corporation), 97 Multi-purpose Primer (Evr-Gard Coatings). Thus, we believe it is unnecessary to add a category for exterior wood primer, sealer, undercoater with a VOC limit of 350 g/l.

9b-11. Comment: The lowering of the VOC limit for sealers and quick-dry sealers to 200 g/l will force these mineral spirits-based products to either raise solids or use alternative exempt solvents, neither of which is feasible. Compliance with the proposed limit of

200 g/l would force solvent-borne interior wood sealers to become cost prohibitive, less efficacious, or potentially dangerous (*e.g.*, flammability of acetone), and would effectively ban all performing products in this category.

Water-borne sealers are less efficacious because they cause grain raise, and can cause wood boards in floors to become glued together. Water-borne sealers are also more expensive than solvent-borne sealers.

We recommend the following category be added with a 350 g/l limit:

> Interior Wood Sealer: A coating formulated and recommended for the application to interior wood surfaces to prevent absorption by the substrate of stains; to prevent harm to the wood; to prevent staining of the wood by outside agents; to prevent dirt from getting into the wood; to prevent subsequent coatings from being absorbed by the substrate; or to prevent harm to subsequent coatings by materials in the substrate.

Response: As noted in Appendix D of the Draft Program EIR, a review of product labels and product data sheets indicates that many of the products in the primer, sealer, undercoater category are intended for use on both interior and exterior surfaces. The 1998 ARB survey gathered data specific to sealers which indicates that 61 percent of the sealer products are for interior use, 26 percent are for exterior use, and 14 percent can be used on either interior or exterior surfaces. In the quick-dry primer, sealer, undercoater category, 27 percent of the volume of coatings were reported to be for use on both interior and exterior surfaces. The dual-use of coatings reported in both the primer, sealer, undercoater category and the quick-dry primer, sealer, undercoater category are mentioned because products reported as primer, sealer, undercoater products may in fact be quick-dry coatings (please see response to Comment #18-2 of the Final Program EIR). There are high complying market shares for both of the above mentioned coatings categories; the complying market share for the primer, sealer, undercoater category is 73 percent, and the complying market share for the quick-dry primer, sealer, undercoater category is 35 percent. In addition, there is not always a clear-cut distinction between sealer products and primer or undercoater products. Creating a product category that is specific to only those products that seal interior wood surfaces would cause those manufacturers with multi-use interior/exterior products to relabel their products, and thus narrow the market for their product.

Compliance is technologically feasible through the use of water-based technology. A review of product data sheets indicates that there are latex sealers suitable for use on interior wood substrates, all of which would comply with the proposed VOC limit for primers, sealers, and undercoaters. The following products make claims of efficacy as interior wood sealers, are not cost prohibitive, and do not contain acetone: PrepRite® ProBlock® Interior/Exterior Latex Primer Sealer (Sherwin-Williams), and Peel Stop Clear Bond Coat (Wm. Zinsser Co., Inc.). Thus, we do not believe it is necessary to create an interior wood sealer category with a 350 g/l limit.

9b-12. Comment: The current definition of stains excludes concrete stains by defining stains as wood coatings. No previous rule has ever limited the stain category to coatings for wood. The commenter recommends deleting the word “wood” from the definition.

Response: The definition for stains has been modified as requested.

9b-13. Comment: Appendix D of the DEIR identifies several companies that have stains able to comply with the proposed limit, however, no products from these companies are shown in Table E-27. In addition, documents received in response to the FOIA request included no product literature for any complying interior semi-transparent wood stains. The only interior semi-transparent stain product literature was for a Deft Stain that did not include VOC information. We believe such vague representations are an inadequate basis for a rule.

Response: The literature search section of Appendix D for this category includes a paragraph that identifies the mentioned companies as having products below 250 g/l. The source of this information, identified by reference, is the SCAQMD Draft Staff Report “Proposed Amendments to Rule 1113 – Architectural Coatings” May 14, 1999. Table E-27 only includes products for which ARB has documentation such as data sheets or other literature. It should be noted that Appendix D also does present a discussion of products that are shown in Table E-27.

Documents that were provided in response to the Freedom of Information Act request did include product literature for compliant interior semi-transparent wood stains. These products include Rhinoguard Wood Defense, Pittsburgh Paints Rez 77-460, Vianova 586 WS, Blue River Coatings Wood Stain, and Okon Weather Pro and Natural Choice. Thus, we disagree that insufficient evidence is provided as a basis for the proposed 250 g/l limit.

9b-14. Comment: A limit for stains of 250 g/l is an effective ban of solvent borne stains. Use of exempt solvents is not a feasible alternative; acetone is too highly flammable, Oxsol 100 is prohibitively expensive, and t-butyl acetate (if exempted) has an unacceptable odor.

Response: Staff does not agree that the proposed limit is an effective ban of solvent-based stains. Solvent-based stains above 250 g/l will continue to be available in quart containers. ARB’s 1998 Survey Results indicate that 86 percent of interior semi-transparent stains are sold in quart containers. Staff believes the use of exempt solvents is a feasible alternative for reformulation of solvent-based stains. Staff does not agree that acetone is too highly flammable (see response to Comment #20-2 of the Final Program EIR). If there is an actual demand for specific performance characteristics from solvent based formulations, the use of exempt solvents or quarts are viable options.

9b-15. Comment: Existing water borne interior wood stains cause grain raising and are prone to lapping problems. Reducing the VOC limit to 250 g/l will only enhance the potential for such problems. If resulting grain raise produces an unacceptably rough surface, sanding must occur after subsequent topcoating (with varnish or lacquer). This can cause entrapment of microfoam in middle coats. This microfoam can not be removed when the raised grain is finally sanded.

Response: The new alkyd/acrylic hybrid polymers, alkyd-modified acrylics, and modified acrylic/water dispersible drying oil formulations maintain acceptable open time and associated lapping performance. Raw materials manufacturers have developed VOC free wet edge enhancers to reduce the potential for lapping problems. These types of formulations specify minimal, if any, grain raising. In addition, one must consider the area to be covered as well as environmental conditions when determining the appropriate application technique which should be used in order to maintain a wet edge and avoid lapping problems. It is also possible to use water-based pre-stain and wood conditioners to help minimize blotching. The concern about microfoam entrapment appears to be related to the application and/or sanding of the subsequent topcoats. It is possible that the microfoam entrapment is the result of the topcoat being applied incorrectly, possibly too quickly. Proper application of appropriate topcoats should result in a smooth final finish.

9b-16. Comment: Recommendation that the limit for interior semi-transparent wood stains be maintained at 350 g/l. A suggested definition for such a category is presented.

Response: Staff does not believe the creation of such a new sub-category is necessary or appropriate. For reasons previously presented, staff believes the proposed limit applicable to interior wood stains is technologically and commercially feasible.

9b-17. Comment: A remaining area of concern involves coatings for tank linings and pipes. These coatings need a higher limit than the 250 g/l VOC limit in the proposed SCM. A separate category for “tank lining and pipe coating” should be included in the SCM that would be similar to, but broader than, the “chemical storage tank coating” category in SCAQMD Rule 1113. The recommended separate category would be applicable to tanks, reservoirs, and piping exposed to water, wastewater, organic solvents, and chemical solutions (aqueous and non aqueous solutions), and would have a recommended VOC limit at 400 g/l.

Response: As discussed in Issue/Response No.2, page 57, Appendix D, Draft Program EIR, dividing the “industrial maintenance” category into subcategories would make the SCM provisions more confusing to the regulated community and more difficult for districts to enforce. Coatings for lining tanks and pipes are currently available with VOC contents below 250 g/l. In addition, due to technical and administrative procedures to be conducted by essential public service agencies, the proposed effective date of the 250 g/l VOC limit has already been extended one year to January 1, 2004, to be applicable to industrial maintenance coating users in general. This time extension was discussed in Issue/Response No. 2 and 3, pages 57-58, Appendix D, Draft Program EIR. There are several reformulation options available to meet the proposed limit by the effective date, as discussed in Section A-12 of Appendix D of the Draft Program EIR.

In subsequent communications with the commenter, we were informed that the company no longer has a concern with the proposed 250 g/l limit applicable to coatings for tank linings and pipe.

COMMENT LETTER #10
Rust-Oleum Corporation
March 31, 2000

10-1. Comment: Industrial maintenance is not a monolithic category. One VOC limit is unrealistic. The proposed 250 g/l limit is questionable for a number of reasons. Industrial maintenance ranges from light-duty to heavy-duty applications.

Response: As already discussed in Issue/Response No. 1, page 57, Appendix D, Draft Program EIR, dividing the "industrial maintenance" category into subcategories would make the SCM provisions more confusing to the regulated community and more difficult for districts to enforce. As defined in subsection 2.26 of the proposed SCM, industrial maintenance coatings are high-performance coatings for use under extreme environmental conditions involving exposure to one or more of the following: immersion in water, wastewater, chemicals, or interior moisture condensation; exposure to chemicals; exposure to temperatures from 250ºF to 400ºF; heavy abrasion including frequent cleaning; or exterior exposure of metal. The proposed SCM definition is consistent with the federal definition and the SCAQMD's Rule 1113 definition, which also do not subdivide industrial maintenance into different duty levels.

The ARB staff is proposing to include three of the small "national" categories in the SCM, as separate categories from the industrial maintenance category. The categories are for antenna coatings, antifouling coatings, and flow coatings. These new categories include special-use small volume coatings for which it is not technologically and commercially feasible to meet the proposed 250 g/l limit in the industrial maintenance category. We do not expect any confusion nor enforcement difficulty with these new categories.

There are reformulation options available to meet the proposed limit for various types of industrial maintenance coatings, including light duty, medium duty, and heavy duty, as discussed in Appendix D-A-12 of the Draft Program EIR. As industrial workers using high-performance coatings, they are expected to have adequate skill, experience, and proper equipment to use coatings necessary for industry to operate.

10-2. Comment: The light-duty uses are applicable to general maintenance workers for servicing equipment used under mild conditions. There will be a shift from low-cost alkyds to higher-cost acrylic enamels. Surface preparation will be more critical and the temperature/humidity requirements will be narrower. The performance of replacement coatings will be adequate.

Response: We agree that acrylic enamels will perform adequately for light duty uses of industrial maintenance coatings. With acrylic coatings and alkyd coatings, proper surface preparation is required to ensure optimum performance. The cost analysis contained in Chapter VIII of the Staff Report shows that cost increases from the proposed SCM are within the range of similar regulations adopted by the ARB and districts. Also, resin and coating manufacturers are making efforts to develop low-VOC alkyd coatings that would comply with the proposed limit.

The SCM includes a “rust preventative” coatings category that is specifically intended to allow limited use of current alkyd coatings under less-severe environmental conditions. The category is for non-industrial users (*i.e.* residential, commercial, and institutional users)**.** The proposed VOC limit in the SCM is 400 g/l and is the same as the national limit already in effect for that category. Historically, district rules (except the current South Coast AQMD rule), have considered the rust preventative coatings as industrial maintenance coatings.

10-3. Comment: The greatest impact will be on the medium-duty uses. The alkyd coatings will be replaced by two-component coatings. These coatings can not be applied by general maintenance workers, who are less experienced people. Also, special application equipment will be needed to apply the two-component coatings. Acrylic (single-component) coatings will not perform well for medium-duty applications. Low-cost alkyds will be replaced by high-cost coatings of questionable utility and performance. The replacement coatings will result in misapplication and more coating use to redo jobs, or less frequent painting because of the difficulty involved.

Response: We disagree with the assertion that compliant coatings will not perform adequately for medium duty uses. Single-component low-VOC acrylic coatings are already available for “medium duty” use, as intended by the manufacturers. For steel substrates, “direct to metal” acrylic coatings are available, that do not require a separate primer coat. For exterior use with sunlight exposure, acrylic coatings are generally superior and more durable than alkyd coatings. Being single-component, acrylic coatings do not have a “pot life” and hence do not generate any waste from exceeding a problem with “pot life.”

We believe that industrial workers have adequate skills to apply high-performance coatings for use under extreme environmental conditions, whether the coatings are one-component, two-component, light-duty, medium duty, or heavy-duty. Industrial workers are already applying the full range of industrial maintenance coatings, and low-VOC coatings will not introduce new techniques to the profession.

Currently, some of the traditional alkyd coatings may meet the definition of “rust preventative coatings” for residential, commercial, and institutional use. The VOC limit for “rust preventative coatings” in the SCM is 400 g/l and is the same as the national limit already in effect for that category. Historically, district rules (except the current South Coast AQMD rule), have generally considered the rust preventative coatings as industrial maintenance coatings. As we mentioned above, we believe that efforts are underway to develop low-VOC alkyd coatings to meet the 250 g/l limit for industrial maintenance coatings. In the future, there may be low-VOC alkyd coatings that are suitable for “medium duty,” as well as for “light duty” industrial use.

10-4. Comment: The high-performance coatings are two-component and 100 percent solids that are applied by professional contractors using plural component spray systems. The heavy-duty uses will go from high-cost coatings to even higher-cost coatings.

Response: The “heavy-duty” coatings already tend to be two-component, high-solids coatings that are higher in cost for the needed high-performance, whether the coatings are solvent-based, water-based, high-VOC, or low-VOC. Since a number of the currently available “heavy-duty” coatings are already low-VOC and comply with the proposed VOC limit, as indicated in Section D-A-12 of Appendix D, and Tables E 11 and 12 of Appendix E of the Draft Program EIR, we believe the cost difference will be minimal. (See Chapter VIII of the Staff Report.)

10-5. Comment: Essential public service agencies (EPSAs, consisting of the Metropolitan Water District of Southern California, the California Department of Water Resources, the California Department of Transportation, and the Los Angeles County Sanitation Districts) have tested low-VOC coatings and have found deficient durability and performance. The SCAQMD provided an extension to the EPSAs to find coatings that comply. In addition, the ARB staff provided an extension from July 1, 2002 to January 1, 2004, in the proposed SCM. The ARB statement that “… complying coatings perform as well as higher-VOC industrial maintenance coatings …” is not true.

Response: Test results from the NTS study show that low-VOC industrial maintenance coatings perform similar to high-VOC industrial maintenance coatings. While we have preliminary information from the EPSA testing, we do not have completed test results for review at this time. Our current understanding is that the EPSA testing is mainly for coatings with VOC contents in the vicinity of 100 g/l, for the purpose of meeting the SCAQMD’s final limit effective in 2006. We believe that very few coatings in the ESPA testing have VOC contents in the vicinity of the 250 g/l limit in the proposed SCM. However, based on actual use experience by the EPSAs, we are including a provision for limited use of coatings up to 340 g/l in persistent fog, low temperature areas of California.

We have been in contact with the ESPAs and have indicated our interest in their testing. When any intermediate or completed test results become available to us, we will review them with the ESPAs. We will also conduct a technology assessment one year before the 250 g/l VOC limit goes into effect in 2004.

10-6. Comment: The NTS study did not adequately or scientifically compare long term protection/durability performance. The study relied on initially observable properties of the few coatings tested.

Response: The laboratory test phase of the NTS study shows that the performance of low-VOC industrial maintenance coatings is similar to the performance of high-VOC industrial maintenance coatings (see Chapter VI and Appendix E of the Staff Report). The field evaluation phase of the NTS study, to confirm the results from the laboratory phase, is still ongoing. The coatings and tests chosen for the NTS study were selected by an advisory committee, in which most of the members are from the coating industry. We will continue to track the NTS study and will consider the results in our technical assessment.

10-7. Comment: ARB staff referenced dubious commercially available products having weak claims, erroneous claims, and depended on market "puffery" that persuades unknowledgeable audiences. These claims lack credibility. ARB staff relied on those unproven product literature claims. Resin supplier claims are unsubstantiated and overblown product literature of questionable veracity. ARB staff does not understand industrial maintenance coatings and uses.

Response: The commenter has provided little information to support his belief that product literature claims are erroneous, unproven, unsubstantiated, overblown, untruthful, and lack credibility. We assume that manufacturers provide accurate information to their customers to improve business and to avoid liability problems. We have reviewed all available information on industrial maintenance coatings and their uses in developing the proposed VOC limits (see Chapter VI of the Staff Report). Specific responses to specific comments are presented below.

10-8. Comment: Product literature from a coating manufacturer showed "imprecise salt spray data, overblown rhetoric, and an erroneous claim of non-carcinogenic asphault (*sic*) based coating."

Response: We reviewed the questioned information and found no basis for the comments made. The "salt spray data" consist of a statement of "no deterioration of test panels," meaning that steel test panels used for exposure testing did not deteriorate. Regarding whether or not the asphalt coating is carcinogenic, we are not aware of any health hazard issue associated with asphalt coatings. During coating application, industrial workers are trained and required to use appropriate protective equipment, including respirators and clothing, and are required to follow industrial safety practices and regulations. We believe that existing procedures and requirements would protect workers. We note that coal tar epoxy coatings are important coatings used for water and chemical immersion service. Bituminous coatings are important coatings used for roofing. Once a coating is cured, we are not aware of any asphalt health problem with asphalt that is securely fixed within solid material. We also note, that thousands of miles of freeways, roads, streets, and parking lots are currently paved with asphalt and are used by the public.

10-9. Comment: Product literature from a coating manufacturer stated
"VOC=70 degree @ 60 degree angle."

Response: This is a typographical error and a photocopy distortion of the information and page. The corrected information is "VOC=0" and "70 @ 60 degree angle." The latter is the gloss rating to be expected from the coating, as measured by a gloss meter that is commonly used in the industry.

We have been informed that this coating is no longer available, and for that reason we have deleted all information from the Draft Program EIR, Final Program EIR, and Staff Report, regarding this coating. The deletion results in only very minor changes to our analysis, notably very small changes in the averages of data pertaining to coating characteristics. Our basic analysis and overall conclusions remain unchanged.

10-10. Comment: Product literature from a coating manufacturer stated "waterborne moisture cure polyurethane coating" (chemically impossible).

Response: We have not been able to contact the coating manufacturer's technical staff concerning this comment. However, we have been informed that this coating is no longer available, and for that reason we have deleted from the Draft Program EIR, Final Program EIR, and Staff Report, all information regarding this coating. The deletion results in only very minor changes to our analysis, notably very small changes in the averages of data pertaining to coating characteristics. Our basic analysis and overall conclusions remain unchanged.

10-11. Comment: Some of the information used by the ARB staff was actually resin supplier data on "starting point formulations" to demonstrate the feasibility of technology. The resin supplier claims of performance may not come true when subjected to verification. The resin manufacturer data are not indicative of commercially available technology and can not be relied upon.

Response: After further review of the questioned information, we concluded that the coating data are indeed for "starting point formulations" from a resin manufacturer. Accordingly, we have deleted, from the Draft Program EIR, Final Program EIR, and Staff Report, all "starting point formulation" data from the resin manufacturer. The deletion results in only very minor changes to our analysis, notably very small changes in the averages of data pertaining to coating characteristics. Our basic analysis and overall conclusions remain unchanged.

10-12. Comment: Product literature from a coating manufacturer indicates a commercially-available, water-based, low-VOC acrylic coating needs a primer coat over metal. The coating may not be used for immersion service.

Response: The coating manufacturer states that the acrylic coating may be used either with a primer coat or used "direct to metal on most exterior and interior surfaces." For certain dark colors, a primer coat is recommended for metallic surfaces, presumably for color considerations. As described in Section A-12 of Appendix D of the Draft Program EIR, multi-coat systems consisting of primer coat and midcoats/topcoats may provide the best performance for extreme environmental conditions. Whether the primer is needed or not may depend in part on the severity of service. For example, in some situations an alkyd primer may be used with an alkyd topcoat.

Each industrial maintenance coating is designed for specific uses, since it is impossible to design one coating that is superior for all uses. Coatings for immersion service in particular are specialized. Epoxy coatings are generally used, not acrylic or alkyd coatings. The particular low-VOC acrylic coating of interest is designed to be used as a topcoat or single-coat coating for exterior and interior use on steel, concrete, and other substrates -- for industrial, marine, institutional, and food processing plant use -- not for immersion use.

10-13. Comment: Product literature from a coating manufacturer indicates that a zero-VOC epoxy coating needs a primer coat over steel and concrete. Pot life, temperature conditions, and humidity conditions concerning application are also questioned.

Response: The coating is a gloss topcoat with various colors available. Generally, topcoats are intended to be applied over primer coats or midcoats. As previously mentioned and described in Section A-12 of Appendix D of the Draft Program EIR, multi-coat systems consisting of primer coat and midcoats/topcoats may provide the best performance for extreme environmental conditions.

For this particular coating, the temperature requirement for the air and substrate is between 50ºF and 120ºF. The relative humidity requirement is for a maximum of 85 percent from 50ºF to 120ºF, and a maximum of 95 percent above 100ºF. These requirements are consistent with other water-based coatings and only slightly narrower than the requirements for many solvent-based coatings. The only notable difference is at the low end of the temperature range, for which a typical solvent-based coating may be used down to about 45ºF or 40ºF, compared with 50ºF for the coating of interest.

The pot life of 45 minutes (at 70ºF) is shorter than the typical two to six hours for other two-component coatings (see Appendix E, Tables E-10, 11, and 12 of the Draft Program EIR). We believe that the short pot life should not be a problem, since the batch size is as small as 1.25 gallons of coating mix at a time, which may be applied very quickly with high capacity, professional spray equipment.

10-14. Comment: Product literature from a coating manufacturer indicates that a water-based, low-VOC polyurethane coating has pot life and shelf life limitations.

Response: The stated pot life of two hours (at 77ºF) and shelf life of one year should not cause any problem. The batch size is as small as one gallon of coating mix at a time, which may be applied very quickly with high capacity, professional spray equipment. The shelf life of one year is essentially the same as other industrial maintenance coatings, including one-component and two-component, high-VOC and low-VOC coatings (see Appendix E, Tables E-10, 11, and 12 of the Draft Program EIR).

10-15. Comment: Product literature from a coating manufacturer indicates that a low-VOC polyurethane acrylate coating uses aziridine as a cross-linker performance enhancer. Aziridine is a carcinogen.

Response: Industrial maintenance coatings in general, including those that are high-VOC, low-VOC, solvent-based, and water-based, may contain various toxic substances.

To achieve the high-performance characteristics needed for extreme industrial use, coating manufacturers have utilized such substances. Coating manufacturers provide specific safety requirements that must be followed. Industrial workers are trained and required to use protective equipment including respirators, and are required to follow industrial safety practices and regulations. Human health aspects of high and low-VOC coatings, including polyurethane coatings containing toluene diisocyanate, are discussed in the Draft Program EIR, pages IV-108 to IV-120. A general discussion of the regulatory framework to protect human health, regarding hazards associated with architectural and industrial maintenance coatings, is discussed in the Draft Program EIR, pages III-53 to III-56.

Information available from the United States Environmental Agency states that aziridine (also known as ethyleneimine) is a "probable human carcinogen of high carcinogenic hazard." Industrial workers are already required to be protected from exposure to other toxic substances present in coatings, and therefore we believe that workers should be similarly protected from exposure to aziridine when this particular polyurethane coating is applied to industrial facilities in accordance with all safety requirements. Regarding public exposure, we believe that this coating would generally be used away from the public. The coating is a two-component coating, so we believe that only workers trained to use industrial-grade spray and other equipment, would use this coating.

According to the manufacturer, the coating has been accepted by the United States Department of Food and Agriculture, and Agricultural Canada, for use in food production facilities. Also according to the manufacturer, the coating is suitable for use at drink and pharmaceutical manufacturing facilities.

10-16. Comment: ARB staff included review of coatings that have limited special uses and or require special equipment. For example, a coating used as a tank lining is a specialized coating that needs special spray equipment.

Response: The coating referred to is a tank lining coating for chemical protection of concrete and steel surfaces at higher temperatures (+200ºF). The coating is intended to resist chemicals, such as high temperature crude oils, high temperature water and brine, and certain other chemicals associated with the petrochemical, water and wastewater, mining and milling, pulp and paper, and certain other industries. The coating clearly meets the definition of "industrial maintenance coating" in the proposed SCM, since the coating is for temperature and chemical resistance. The coating may be applied with heavy-duty airless and conventional spray equipment. These are typical spray equipment used in industry.

10-17. Comment: ARB staff included review of coatings that have limited special uses and or require special equipment. For example, certain coatings are force-cured (heat-cured) coatings.

Response: The coatings referred to are temperature, chemical, or abrasion resistant coatings used to protect equipment at electric power plants and various other industrial facilities. The coatings clearly meet the definition of "industrial maintenance coating" in Section 2.26 of the proposed SCM, since the coatings are for temperature, chemical, or abrasion resistance. The category of "industrial maintenance coatings" does not exclude force-cured (heat-cured) coatings.

10-18. Comment: ARB staff included review of coatings that require special equipment. For example, an epoxy coating requires heated plural-component airless spray equipment.

Response: As discussed in the response to Comment #10-1 of the Final Program EIR, the category of industrial maintenance coatings includes high-performance coatings for use under extreme environmental conditions. The category of "industrial maintenance coatings" does not exclude coatings that require heated plural-component airless spray equipment.

10-19. Comment: ARB staff included review of a coating characterized by a gel time of five seconds. The commenter views this as a problem.

Response: The manufacturer states that the coating "sets in seconds to reduce facility downtime." We do not view this as a problem, since five seconds is sufficient time from the tip of the spray equipment to the surface and subsequent gel formation. The commenter may be confusing gel time with pot life, which is different. Pot life is described in Section A-12 of Appendix D of the Draft Program EIR. The coating is clearly in the category of "industrial maintenance coatings," since the coating is used for chemical resistance, temperature extremes, weather extremes, and abrasion resistance.

10-20. Comment: ARB staff depended on "technical" articles by industry suppliers. There is the issue of conflict of interest. The articles do not validate technology that has not been tested thoroughly.

Response: We believe that the resin manufacturers and suppliers are at the forefront of developing new technologies, in particular new resins, that may be used for developing new low-VOC coatings for the future. If the resin suppliers publish information about their research and development, we do not view this as a conflict of interest. We depend on information from the resin suppliers mainly to find what technologies may be emerging from research efforts, to either modify noncompliant coatings to comply, or to replace noncompliant coatings with compliant ones. We do not rely on resin supplier information in terms of validating technology or as test results for validating technologies.

As discussed in Chapter IV of the Final Program EIR, we relied on several approaches in our development of the proposed VOC limits for the proposed SCM. Information from resin manufacturers and suppliers is just one of the approaches.

10-21. Comment: ARB staff should unify coating categories and VOC limits in the proposed SCM with those in U.S. EPA's National Rule.

Response: The proposed definition in the proposed SCM is similar to the national definition. Our review of the "niche" categories (see Section B of Appendix D of the Draft Program EIR) shows that only a few of the "national categories" need separate VOC limits in California. The National Rule is intended to be minimum national requirements. Because California has the most severe ozone air quality problem in the nation, California needs to adopt lower VOC limits that are technologically and commercially feasible.

The SCM includes a "rust preventative" coatings category that is specifically intended to allow limited use of current alkyd coatings. The category is for non-industrial users (*i.e.* residential, commercial, and institutional users)**.** The VOC limit in the SCM is 400 g/l and is the same as the national limit already in effect for that category. Historically, district rules (except the current South Coast AQMD rule), have considered the rust preventative coatings as industrial maintenance coatings.

10-22. Comment: ARB should segregate industrial maintenance into real use categories, and set VOC limits based upon proven, fully tested technology.

Response: Subdividing the category would make the provisions in the proposed SCM more confusing to the regulated community and more difficult for the districts to enforce (see response to issue no. 2, Section A-12, Appendix D, Draft Program EIR, pages 57-58 and to Comment #10-1a of the Final Program EIR). Our technology assessment shows that industrial maintenance coatings that comply with the proposed VOC limit are technologically feasible and commercially available for essentially any type of use, including "light-duty," "medium-duty," and "heavy-duty." Available test results show that low-VOC coatings perform similar to high-VOC coatings.

The SCM includes a "rust preventative" coatings category that is specifically intended to allow limited use of current alkyd coatings. The category is for non-industrial users (*i.e.,* residential, commercial, and institutional users)**.** The VOC limit in the SCM is 400 g/l and is the same as the national limit already in effect for that category. Historically, district rules (except the current South Coast AQMD rule), have considered the rust preventative coatings as industrial maintenance coatings.

10-23. Comment: ARB staff should consider allowing coating manufacturers of industrial maintenance coatings to average higher VOC coatings for light to moderate duty uses, with lower VOC coatings for super high-performance specialty uses.

Response: We will consider this suggestion during our ongoing development of an overall averaging provision for the proposed SCM. Please see the response to Comment #1-2 of the Final Program EIR.

10-24. Comment: The commenter would like the opportunity to meet with ARB staff to expand on the comments. The commenter would also like to discuss the ARB staff's response to issue #17-1, concerning the time extension of the effective date of the VOC limit to

January 1, 2004, and the ongoing EPSA tests indicating that low VOC coatings are not available.

Response: On April 11, 2000, we met with the commenter to discuss these and other comments. Also, see responses to Comments #16-3 and #16-4 of the Final Program EIR.

COMMENT LETTER #11
Ventura County Air Pollution Control District
April 4, 2000

11-1. Comment: The commenter finds the Draft Program EIR to be thorough and accurate, and concurs with the conclusions made regarding significance of the impacts. Once certified by the ARB, districts can incorporate the EIR by reference in CEQA documents prepared for their own architectural coating rules.

Response: We appreciate and concur with the District's assessment of the value of the Draft Program EIR. The commenter is also referred to the response to Comment #3-2 of the Final Program EIR for a description of the use of the EIR by the districts.

11-2. Comment: Comment: The term "VOC content" is used inconsistently throughout the EIR, relating to whether or not the VOC content is calculated as less water and exempt solvents, and can give significantly different values. The VOC calculation method (as presented in Section 6.1 of the SCM) should be clearly indicated wherever the term is used. It is not clear in Table II-3 how the anticipated VOC emission reductions were calculated.

Response: The suggested changes have been made in the Final Program EIR.

11-3. Comment: The discussion of "significance criteria" in Section IV.C.1 does not include a discussion of consistency with air quality plans, yet consistency is discussed in Section IV.F but not in the Executive Summary. Consistency should either be included in the "Air Quality Impacts," or the Executive Summary should be revised to reflect the actual format and content of the Section IV text.

Response: The latter suggested changes have been made in the Final Program EIR.

11-4. Comment: Section IV air quality impacts include an extensive analysis of the potential negative air quality impacts of the SCM, while Section II details the purpose of the SCM and the positive air quality impacts. Positive air quality impacts are discussed very little in Section IV. District staff suggests that Section IV contain a more detailed discussion of positive impacts such as reduction of VOC emissions and lowering of ambient ozone concentrations on a statewide basis.

Response: The suggested changes have been made in the Final Program EIR by referring the reader of Section IV to Section II.

11-5. Comment: Section IV.B. states that SCAQMD's significance criteria tend to be the most conservative, but Ventura County APCD's significance thresholds are more conservative.

Response: The commenter is referred to the response to Comment #3-1 of the Final Program EIR.

11-6. Comment: The emission reductions in the Section IV.C.1 do not agree with the figures presented in Table II-3 and on Page IV-61.

Response: The corrections have been made in the Final Program EIR.

COMMENT LETTER #12
Golden Artist Colors, Inc.
April 5, 2000

12-1. Comment: We request that the VOC limit for faux finishes be changed from 350 to 700 g/l. The 350 g/l VOC limit does not allow for products that meet the performance demands of professional faux finishers, as shown in the attached comments that were sent to your staff. The ARB believes that a product at 350 g/l has the same open time as a product at 700 g/l (response to issue #1, page 34, Appendix D of the Draft EIR), but provided no basis for this statement. We tested actual products and found that the open time is directly proportional to the VOC level. The low VOC product tested with reported VOC up to 350 g/l had 7-10 minutes open time on the edges, while our product was open for 20 minutes. While simple techniques can be accomplished with products having the shorter open times, more sophisticated finishes require more steps and even 20 minutes challenges finishers.

Response: As discussed in the Draft Program EIR, we do not believe that a 700 g/l VOC limit is necessary for faux finishes because of the variety of faux finishes available at or below the proposed 350 g/l VOC limit. These lower VOC faux finishes are widely available and generally below 250 g/l, which is the VOC limit for these coatings in many districts in California. The comments sent to ARB staff by two individuals indicating their preference for the commenter’s product do not indicate that a 700 g/l VOC level is appropriate. There may be other individuals that have a preference for the lower VOC products as well. Regarding the “open time” (dry time) of the lower VOC products, the Draft Program EIR cites a faux finish manufactured by Sherwin Williams with a VOC content of 248 g/l and a reported open time of about 15 minutes. This was compared to the open time of higher VOC products such as the commenter’s product, with a reported open time of 10 to 30 minutes. The test data supplied by the commenter in their April 5, 2000, letter (and subsequent electronic mail submitted after the public comment period) did show that their product has a longer open time than the lower VOC products mentioned in the Staff Report. However, the dry time data generated by the commenter tested faux finishes on a flat paint basecoat, which decreases the open time. As mentioned in the Staff Report, most manufacturers of faux finishes recommend a basecoat of semi-gloss or satin/eggshell paint to extend the open time. We also note that the low VOC faux finishes tested by the commenter are generally below 250 g/l, which is less than the 350 g/l limit proposed in the SCM. Therefore, the commenter would not need to reformulate their product down to the level of most of the products they tested. Finally, faster dry times can be accommodated by working in smaller areas, as mentioned in the Staff Report.

COMMENT LETTER #13
Los Angeles Department of Water and Power (LADWP)
April 6, 2000

13-1. Comment: The essential public service agencies (EPSA) group, in conjunction with the South Coast AQMD, is conducting a test program for corrosion-protection industrial maintenance coatings complying with the proposed 250 g/l limit. The Los Angeles Department of Water and Power (LADWP) recommends that the ARB staff formally recognize the test program in the final EIR for the SCM. The test results are crucial in determining the low-VOC limits for industrial maintenance coatings. Industry will also be interested in the test results.

Response: We recognize the importance of the EPSA test program, and will recommend that our Board, at the June 22/23, 2000, meeting, take action to formally recognize the test program as suggested. We will track the ESPA test program and will review the associated SCAQMD technical assessment when available. We will conduct our own technology assessment one year before the 250 g/l limit goes into effect in 2004.

13-2. Comment: The LADWP supports the ARB staff's revised proposal for a one-year extension of the effective date, to January 1, 2004, for industrial maintenance coatings. The additional year will provide more time to test low-VOC coatings. However, the LADWP is still concerned that low-VOC coatings may not perform adequately, and that not all the testing will be sufficiently completed before the compliance date. The LADWP would like to discuss available EPSA test results with the ARB staff at least six months before the compliance date.

Response: We intend to review and discuss the EPSA test results with the EPSA, as results become available. We will conduct a technology assessment one year before the 250 g/l limit goes into effect in 2004.

13-3. Comment: Coating manufacturers recommend that the ARB staff not rely on product data sheets, provided by coating manufacturers. Some product data sheets can be viewed as sales brochures that represent overly optimistic views of coating performance. The LADWP supports the coating manufacturers' recommendation and recommends that the ARB staff review the EPSA test results.

Response: We will review and discuss the EPSA test results with the EPSA, as results become available. As discussed in the Draft Program EIR and the Final Program EIR, we considered various information in developing the proposed VOC limits. In addition to product data sheets, we considered information from resin manufactures, independent testing, VOC limits from federal and district regulations already in effect, publications from industry/trade journals, and discussions and input from various affected groups such as EPSAs.

13-4. Comment: The LADWP supports the ARB staff efforts for a higher VOC limit for industrial maintenance coatings to be used in the coastal areas of California, where there is highly corrosive salt air. Electric power plants are commonly located next to the ocean to use ocean water for the condenser cooling. These electric power plants have substantial equipment that must be protected from corrosion with the use of industrial maintenance coatings.

Response: According to Caltrans, in a “multi-agency” EPSA letter dated July 21, 1999, the areas of concern are within one to fifteen miles from the California coastline, estuaries, or bays, where coastal fog exists more than six months per year. During a December 1, 1999, meeting at the ARB, Caltrans further informed us that the coastal areas of concern range from Point Sur, in Monterey County, north to the Oregon border. The problem in the coastal areas mainly involve the high humidity and low temperatures, and the slightly narrower temperature and humidity requirements for water-based coatings to be applied onto substrates, compared with solvent-based coatings. The conditions along the coast make the Caltrans coating operations for bridges more limited with low-VOC coatings, since the acceptable days to apply coatings become even more limited. Our current efforts for a higher VOC limit are mainly to address the coating application problem along the coast that affect Caltrans and other industrial maintenance coating users, such as operators of electric power plants. We have added Section 3.8 to the proposed SCM to address this concern.

13-5. Comment: The LADWP needs a low-VOC, quick-dry primer to coat electrical equipment, such as transformers. Equipment must be prime-coated, quickly dried, top-coated, and returned to service within eight hours to minimize electrical down-time for impacted industry, businesses, and residences. The coating system then must last ten years. Test primers will be included in the EPSA test program. If the primer coatings do not pass the testing, LADWP recommends that a higher VOC category be created for such primers.

Response: We will track the ESPA test program and will review the associated SCAQMD technical assessment when available. We will conduct our own technology assessment one year before the 250 g/l limit goes into effect in 2004 and make a determination at that time whether or not to propose revising the SCM.

The proposed SCM already includes a new “flow coatings” category specifically for coating the cooling fins of electrical transformers. The proposed VOC limit for “flow coatings” is 420 g/l (see Section A-10 of Appendix D of the Draft Program EIR).

COMMENT LETTER #14
Ameron Coatings
April 7, 2000

14-1. Comment: The exclusion of floor coatings from the latest proposed definition of industrial maintenance coatings is inappropriate. The ARB survey data does not reflect this new definition. It is common practice in industrial settings to use the same coating that is specified for the walls of a facility on the floors as well. The limit for floor coatings should be 250 g/l or the definition of Industrial maintenance coatings should not exclude floor coatings.

Response: In response to this comment as well as other concerns, the SCM has been modified as requested. (See also response to Comment #4b-22 of the Final Program EIR.)

14-2. Comment: The proposed SCM specifies a limit of 100 g/l for industrial floors, under the “floor coatings” category, but specifies a limit of 250 g/l for vertical surfaces (such as industrial concrete walls and structural steel) under the “industrial maintenance coatings” category. For some very-high solids and 100 percent solids coatings for complying with a 100 g/l limit, Method 24 provides unrealistic high measurements of VOC content, due to the test temperature of 110ºC. A coating used at ambient temperatures may be zero VOC, but with the Method 24 test temperature, the test results may show as high as 150 g/l VOC.

Response: The proposed SCM has been revised to include industrial floors in the “industrial maintenance coatings” category, so the 250 g/l VOC limit for “industrial maintenance coatings” would apply to industrial floors as well. This change would simplify the use of coatings at industrial facilities, since the same industrial maintenance coating may be used on both vertical surfaces and floors. With various earlier proposals for the SCM, the floor coatings VOC limit was applicable because it was the most restrictive limit, since the “floor coatings” category did not exclude industrial floors. With the current revision to the proposed SCM, the “floor coatings” category does not apply to industrial floors.

Based on the information provided by the commenter regarding Method 24, and our revision to a VOC limit of 250 g/l for industrial floors, we believe that Method 24 should no longer be a problem for the very-high solids and 100 percent solids coatings of concern. The VOC limit at 250 g/l is well above the 150 g/l level from Method 24 test results, as commented.

14-3. Comment: The coatings identified in the literature search and cited in the references of Appendix D are not well suited for severe service environments. They would not be suitable for rigorous and repeated steam cleaning as required in food processing industries nor would they have sufficient chemical resistance required for use in pulp and paper facilities or the chemical process industries.

Response: Several of the products identified by staff are recommended for extreme abrasion and chemical resistance applications and specify use in USDA facilities. These products simply represent a sample of those currently available below 100 g/l. With the revised limit for this category of 250 g/l, compliant product availability is increased considerably. The compliant market share from the ARB survey increased from 35 percent to 85 percent as a result of the limit increase.

14-4. Comment: Staff should not consider starting formulas from raw material manufacturers evidence of product availability. Uses of such starting formulas often produce less-than-promised results.

Response: Staff realizes that such starting formulas do not produce a finished product. The intent of such formulas is to provide coatings manufacturers with a starting point for the development of new coatings with the specific performance characteristics associated with the raw materials. It would not make sense for a major raw material manufacturer to market materials that promise certain performance characteristics, unless the material manufacturer believed that a coating manufacturer would actually be able to develop an acceptable finished product.

14-5. Comment: The projected costs for compliance we submitted in response to the ARB Economic Impacts Survey were based on an analysis of our High Heat, Metallic Pigmented and Industrial Maintenance product lines as we understood them to be defined in the SCM draft dated 12/1/99. However, the 2/11/00 draft SCM excluded Floor Coatings from the Industrial Maintenance category. As previously stated, we have no accurate way of distinguishing sales in these coatings categories. We are very disappointed because the data submitted in the Economic Impacts Survey would be invalid if these definitions are changed and we have no data that would allow use to access [*sic*] the impact of these definition changes on our survey response.

Response: This comment has been addressed with the new proposed 250 g/l standard for Floor Coatings, which is the same VOC limit as the standard for Industrial Maintenance coatings, and with the deletion of the language excluding floor coatings from Industrial Maintenance coatings. Because of these changes to the SCM, the in-house cost analysis the commenter performed under a 250 g/l standard should be applicable under the new Floor Coating standard.

14-6. Comment: The SCM should add a category for Nuclear coatings like that in the National Rule. We do not dispute the availability and/or technical feasibility of compliant coatings, but rather the economic feasibility. This is because of the expensive testing requirements. It cannot be assumed that a product approved in one plant can be used in another because the conditions vary with different plants and reactors. Further testing is required when a new coating system is used on an old one or on a new substrate. We also believe that the small quantities used in California should be considered.

Response: California has two nuclear facilities, Diablo Canyon and San Onofre. As stated in the Draft Program EIR, staff contacted personnel at both of these facilities and found that: (1) in the case of San Onofre, all of the coatings they use are below the proposed 250 g/l level; and (2) in the case of Diablo Canyon, they use primarily coatings below 250 g/l, and can use quarts for the few cases where higher VOC coatings may be needed. Therefore, we believe that the proposed VOC limits are economically feasible and will not require extensive testing.

COMMENT LETTER #15
Kessler and Associates Business Services, Inc.
April 7, 2000

15-1a. Comment: The SCM is an unenforceable guideline which districts may choose to adopt and enforce in the future. The SCM bans architectural coatings with VOC contents higher than the limits set in the SCM. The Draft Program EIR does not fulfill CEQA requirements because of factual errors, misinterpretation of accepted science, and questionable policy decisions, and incorrectly concludes that the SCM will have no adverse environmental impacts. Consideration of region-by-region effects of the proposed SCM is essential because the effects of VOC reductions on ozone vary in different areas of California. The SCM may cause significant adverse regional impacts, while providing virtually no environmental benefit anywhere. The Draft EIR has ignored these consequences and misinformed the public about the true impact of the SCM.

Response: We disagree that the SCM bans architectural coatings; in fact, that assertion conflicts with the commenter's earlier statement that the SCM is an unenforceable guideline. District rules based on the SCM will necessitate reformulation of coatings with VOC contents higher than the limits in the proposed SCM. However, Chapter VI of the Staff Report demonstrates that each of the VOC limits in the SCM is technologically and commercially feasible by the proposed effective date. We disagree with the commenter's statements that we have made errors in the Draft Program EIR that invalidate our conclusions that the SCM will have no adverse environmental impacts. The commenter makes some general, nonspecific remarks that the Draft Program EIR's technical analysis is flawed. The ARB staff does not agree with these general remarks, and the reasons for the ARB's position can be found throughout the responses to the various comments made on the Draft Program EIR.

In addition, contrary to the commenter's statements, we have performed a region-by-region analysis of environmental impacts and mitigation wherever practical (*e.g.*, water demand, POTW impacts, and solid waste impacts in Chapter IV of the Draft Program EIR). As a result of this analysis, we are proposing to allow the use of higher VOC industrial maintenance coatings in areas with persistent fog and cold temperatures. We have also proposed higher VOC limits for bituminous roof coatings and bituminous roof primers to allow for the use of solvent-based products in cooler areas of the State. We received no data to substantiate regional performance issues in any categories except industrial maintenance and bituminous coatings.

We have also considered how VOC and NO_x conditions typical of various areas of the State may impact the effectiveness of ozone reduction strategies. We agree with the commenter that ozone production is influenced by a myriad of factors including VOC and NO_x concentrations, and topographic and meteorological conditions. These factors vary not only throughout California, but also on a daily basis.

However, we cannot agree that the SCM may cause significant adverse regional impacts, while providing virtually no environmental benefit, or that we have misinformed the public about the true impact of the SCM. The commenter has failed to provide any basis for those claims and, as explained above, we have considered regional effects and documented the environmental benefits in Chapters II and IV of the Final Program EIR. Based on this analysis, ARB staff has concluded that reducing VOC emissions from architectural coatings is an effective ozone control strategy for nonattainment areas, and will not result in adverse environmental impacts (see the response to Comment #15-39 of the Final Program EIR).

15-2. Comment: The Draft EIR does not properly evaluate the science of ozone production and destruction. The necessary understanding of the objectives, and the mechanisms used to achieve the objectives, of using VOC regulations to reduce ozone is lacking. The ARB should re-evaluate its emphasis on statewide VOC controls as the primary tool for reducing ozone, in light of the National Academy of Sciences findings in "Rethinking the Ozone Problem" which concluded that NO_x control *instead* of VOC control was the optimal ozone reduction strategy in some areas. The Draft EIR should explain the effect on ozone levels of VOC emission reductions in the presence of varying NO_x levels, and should include a detailed examination of NO_x transport across California. VOC regulations alone cannot attain the NAAQS, and can be counterproductive if not optimally implemented. NO_x reductions and control of NO_x transportation are crucial. VOC control may be ineffective in reducing ozone and in fact can *increase ozone levels* in some circumstances. The Draft EIR should determine *where* VOC controls will be effective and ineffective, including mapping areas conducive to negative reactivity. Instead, the Draft EIR assumes that VOC emission reductions are the optimal strategy in all regions of California, which in turn precludes ARB from understanding the true effects of the SCM and its environmental impact. The Draft EIR does not comply with CEQA.

Response: ARB staff disagrees with the commenter's assertion that the Draft Program EIR does not properly evaluate the science of ozone production and destruction. The description of ozone formation contained in pages IV-76 through IV-79 of the Draft Program EIR contains all of the relevant facts regarding the production or destruction of ozone in the atmosphere.

The recommendation of the National Academy of Sciences (NAS) was: "To substantially reduce ozone concentrations..., the control of NO_x emissions will probably be necessary in addition to, or instead of, the control of VOCs" (page 11, *Rethinking the Ozone Problem in Urban and Regional Air Pollution*). Modeling of local VOC/NO_x conditions is necessary to predict the effects of VOC and NO_x on ozone concentrations. We explain the relationship between VOC and NO_x levels on ozone levels, the effectiveness of VOC controls, and the concept of negative reactivity, in the response to Comment #15-39 of the Final Program EIR.

We agree with the commenter that VOC regulations alone cannot attain the national ambient air quality standards; for that reason we have both VOC and NO_x controls in California. However, we do not agree that VOC controls can be counterproductive to either peak ozone or population exposure, as will be explained in the response to

Comment #15-39 of the Final Program EIR. We also do not agree that the Draft Program EIR assumes that VOC emission reductions are the only optimal strategy in all regions of California. We have focused on VOC reductions in the Draft Program EIR because architectural coatings emissions are VOCs; however, we do discuss that the ARB's and districts' overall emission reduction strategy is based on statewide VOC *and* NO_x control in Chapter IV of the Draft Program EIR. For these reasons, we disagree that the Draft Program EIR does not comply with CEQA.

15-3. Comment: Dunn-Edwards hopes its comments will clear up misinformation and provide a sound basis for an SCM that improves the environment and allows continued production of high quality coatings.

Response: The ARB staff welcomes constructive dialogue with Dunn-Edwards and other companies on scientific issues of mutual interest.

15-4. Comment: A program EIR is not the appropriate CEQA document for the SCM because it does not provide the technical information needed to evaluate the potential adverse environmental impacts of the SCM. It is incorrect to assume that effects of VOC reduction on ozone levels will be qualitatively identical across airsheds. In general, the Draft Program EIR does not fulfill CEQA requirements because it contains factual errors, improper analysis of statistical and technical data, and the misinterpretation of accepted science. As a result, the Draft Program EIR incorrectly concludes that the SCM will have no adverse environmental impacts.

Response: In commenting that a program EIR is "not the appropriate CEQA document", the commenter does not appear to be criticizing the principle of using a program EIR for the SCM (as opposed to some other type of EIR). Rather, the commenter objects to the Program EIR because he believes that the analysis contained in the EIR is inadequate. In making this criticism, the commenter first makes some general, nonspecific remarks that the EIR's technical analysis is flawed. The ARB staff does not agree with these general remarks, and the reasons for the ARB's position can be found throughout the responses to the various comments made on the EIR. The commenter also offers one more specific criticism—that the Draft EIR inappropriately assumes that the impacts of the SCM on ozone levels will be qualitatively identical across different airsheds in different regions of the state, and that this assumption glosses over the possible negative impacts on ozone that may occur because of region-by-region differences in atmospheric chemistry. The ARB staff does not agree with this criticism, for the reasons discussed at length in the responses to Comments #15-1, #15-5, #15-24, and #15-39 of the Final Program EIR.

15-5. Comment: The technical analysis of the impacts in the Draft EIR is vague and does not address the unique conditions of each air district. The commenter states that the ARB assumes that each district will prepare its own CEQA analysis, and suggests that most districts do not complete CEQA documentation, nor do they have staff resources or experience to prepare additional CEQA documents to support district rules based on the SCM.

Response: We disagree that we have not considered the effects of the SCM based on regional conditions. The commenter is referred to the response to Comment #15-1 of the Final Program EIR for examples of how we have accounted for regional effects. The possible ways that the ARB expects the districts to use the EIR are described on page I-3 of the Draft Program EIR. The districts may utilize the Final Program EIR as the basis of whatever CEQA documents the districts choose to prepare. It is not true that most districts fail to prepare CEQA documentation, although CEQA analysis may take several forms depending on individual district policies and the particular rules being considered.

15-6. Comment: The Draft EIR does not include adequate analysis of potential adverse environmental consequences associated with the SCM. The Draft EIR does not include adequate analysis of significant effects on air quality and ozone formation throughout California. The Draft EIR does not hint that there could be negative or qualitatively different effects of ozone levels in certain regions of the state. As a result, the SCM is flawed and the Draft EIR is non-compliant with CEQA requirements.

Response: ARB staff disagrees with the commenter's assertion that the Draft Program EIR does not adequately analyze potential adverse environmental impacts because it does not address impacts throughout California. Chapter IV of the Draft Program EIR contains a detailed discussion of negative reactivity and regional effects on ozone. The commenter is referred to the response to Comment #15-39 of the Final Program EIR for a further discussion of negative reactivity and regional effects on ozone. For the reasons discussed in Comment #15-39 of the Final Program EIR, we disagree with the commenter's assertion that the SCM is flawed and the Draft Program EIR does not comply with CEQA.

15-7. Comment: The Draft EIR incorrectly assumes that VOC emissions from architectural coatings make up four percent of the VOC inventory. As a result, the Draft EIR overestimates the necessity and environmental benefits of the SCM, while underestimating the adverse environmental impacts of the SCM. The ARB should re-evaluate the conclusions of the Draft EIR and reconsider the advisability of the SCM.

Response: We disagree with the assertion that the ARB incorrectly assumes that VOC emissions from architectural coatings make up four percent of the VOC inventory. The inventory for area sources like architectural coatings and consumer products is based on periodic surveys, in which manufacturers provide data on VOC content and sales of products in California. The ARB and districts utilize a variety of methods to measure emissions from stationary point sources and mobile sources in California. The proportion of the inventory contributed by architectural coatings is dependent on the contribution from other sources, but the inventories from all sources and the methods used to estimate emissions are based on the best available data. We respond to the commenter's specific issues with the architectural coatings inventory in the response to Comment #15-9 of the Final Program EIR. Therefore, we disagree with the commenter's general statement that because of errors in the emission inventory, the Draft Program EIR overestimates the benefits and underestimates the adverse impacts of the SCM, or that our conclusions and recommendations are incorrect. In fact, the architectural coatings inventory discussed in the Draft Program EIR is based on 1996 sales data provided by manufacturers in the 1998 ARB survey.

15-8a. Comment: Contrary to the Draft EIR's characterization, the SCM does not regulate VOC emissions, but rather regulates the VOC content of architectural coatings. The Draft EIR incorrectly assumes that reductions in VOC content translate into reductions in VOC emissions. CARB addresses this assumption in its response to Dunn-Edwards' July 12, 1999 comment on CARB's Initial Study, claiming that it is supported by the use of Method 24 which purports to measure VOC emissions from Architectural Coatings. (EIR Appendix C-4). Dunn-Edwards believes that Method 24 does not accurately measure VOC emissions from coatings under real-world evaporative conditions because Method 24 measures VOCs emitted from coatings when the coatings are heated above the boiling point of water. Therefore, the expected benefits of the SCM and projections/conclusions regarding the SCM's effect on ozone levels should be re-examined.

Response: Architectural coatings are regulated based on VOC content because VOC content is directly measured by Method 24 for compliance purposes. Thus, a regulation based on VOC content is necessary to enforce the VOC limits (*i.e.*, U.S. EPA Method 24). Regulating architectural coatings by VOC content is consistent with existing district rules and the National AIM rule.

ARB staff disagrees with the commenter's assertion that Method 24 does not accurately measure VOC emissions from coatings. Method 24 was developed to simulate, in a reasonable amount of time, the emissions from the coating over the life of the coating. ARB's Monitoring and Laboratory Division (MLD) used Method 24 to analyze several hydrocarbon distillate cuts similar to those used in architectural coatings to determine the percentage of VOCs actually emitted. Method 24 did not drive off all of the VOCs in some of the samples, some of the heavier VOCs remained. Thus, Method 24 already accounts for low volatility VOCs in architectural coatings. Method 24 is the best test method available at this time and is required by the U.S. EPA.

The commenter provides no basis for his statement that reductions in VOC content do not translate into reductions in VOC emissions. Because architectural coatings are applied as a liquid and are designed to dry, the majority of VOCs from architectural coatings evaporate, and therefore are emitted into the atmosphere. This issue is discussed further on pages V-147 through V-148 of the Draft Program EIR.

The commenter makes an unsubstantiated claim that reductions in VOC content do not translate to reductions in VOC emissions and, therefore, the SCM does not have an effect on ozone levels. We disagree because the best available evidence indicates that the majority of VOCs in coatings evaporate and become VOC emissions, and thus are available to form ozone in the atmosphere.

15-9. Comment: The Draft EIR attempts to dismiss the discrepancy between emission inventory estimates and ambient monitoring data by citing a source apportionment study with an erroneous and misleading analysis. The study does not report that architectural coatings are a major contributor to ambient VOCs in the South Coast Air Basin, but rather that surface coatings in aggregate are major contributors. Several errors were made in reporting and interpreting the results of the study. The discrepancies pointed out by the commenter raise questions as to whether architectural coatings significantly contribute to air pollution, and whether future regulation of architectural coatings is warranted, especially the drastic reductions of the proposed SCM.

Response: The source apportionment study by Fujita, *et al.* (Determination of Mobile Source Emission Fraction Using Ambient Field Measurements, Final Report for the Coordinating Research Council, July 23, 1997) was not introduced in the Draft Program EIR to validate the emissions inventory. Rather, we were responding to the commenter's claim that ambient monitoring data show that architectural coatings contribute substantially less to the inventory than reported by the ARB. To quantify our previous response to the commenter, we used the Fujita *et al.* study, excerpts of which were submitted to us by the commenter after the August 1998 workshop in which these issues were discussed. As explained on page II-20 of the Draft Program EIR, we were reporting on the Fujita work as reported in Table 3 of a review article by Watson, *et al.* (Review of Volatile Organic Compound Source Apportionment by Chemical Mass Balance, undated publication at: http://narsto.owt.com/Narsto/reactinfo.html). The reason we used the Watson paper was that it explained which representative species of which coating categories were actually measured by the monitors. Table 2 of the Watson paper shows that the species profiles used to represent the architectural coatings only covered solvent-based quick dry primers and graphic arts coatings. The solvent-based graphic arts coatings and quick dry primers make up less than five percent of the VOC emissions from architectural coatings, according to the ARB's 1998 architectural coatings survey. Thus, the speciation was not fully representative of solvent-based architectural coatings and did not include water-based coatings. As reported on page II-20 of the Draft Program EIR, Fujita confirmed to us that the sampling and analysis methods used in this study focused on emissions from motor vehicles, and did not attempt to quantify the types of oxygenated compounds commonly contained in water-based coatings. Therefore, the study underestimated the contribution of architectural coatings.

We agree with the commenter that the solvent-based coatings account for 67 percent of the total VOC emissions, and the contribution of architectural coatings to the inventory should be measured in emissions rather than overall volume of paint sold. Again, this 67 percent figure comes from our 1998 architectural coatings survey, not monitoring data.

In response to the commenter's concerns, we have investigated the differences in the contributions of architectural coatings as reported by Watson, *et al.* versus those in the original Fujita, *et al.* paper. It does appear that the summary range cited in the Watson paper was inadvertently derived from a different line of the table in the original study. Nonetheless, as discussed in the Draft Program EIR, the Fujita, *et al.* study was designed to measure vehicular emissions. The author has told us that the results should not be considered to be representative of coatings in the Los Angeles area. Because the study focused on vehicular emissions, the monitors were not designed to get representative regional contributions from architectural coatings. This study attempted to assign emissions to only a few of the many dozens of hydrocarbon emission categories. In fact, it is more notable that architectural coatings were observed when the study was not specifically designed to measure them. The author also pointed out that there is a high degree of uncertainty in the values reported in the study, as represented by the standard deviations. A very carefully designed study specifically for architectural coatings emissions would be required to better confirm the inventory.

Based on our explanation of the reasons for the problems with the numbers we reported and the limitations of the source apportionment study, we cannot agree that it is questionable whether architectural coatings significantly contribute to air pollution. We also disagree that the alleged discrepancies between the source apportionment study and the architectural coatings inventory cast doubt on whether future regulation of architectural coatings, such as that proposed in the SCM, is warranted. We believe that the survey method of determining the inventory (as described in the response to Comment #15-7 of the Final Program EIR) is more accurate than relying on a motor vehicles source apportionment study in which architectural coatings were only coincidentally found.

15-10. Comment: (a) The ARB's justification for the SCM is the supposed need to reduce VOC emissions from architectural coatings estimated to be 11.3 tons per day if adopted statewide. The Draft EIR's own statistics, however, demonstrate that regulation is not necessary to achieve this goal. First, the Draft EIR incorrectly asserts that "for the most part, California districts will not see additional emission reductions from the National Rule, since the majority of the national limits are equal to or higher than the districts' limits." Currently, only one half of California's 35 air districts have adopted limits more stringent than EPA's national architectural coatings rule. All other districts must comply with the National Rule and so will achieve the attendant emission reductions.

(b) The Draft EIR indicates that from 1990 to 1996, a period in which no significant new architectural coating rules or amendments to pre-existing rules were put into effect in California, VOC emissions from architectural coatings fell from 126 tons per day to 117 tons per day. This translates into a reduction of seven percent or 1.2 percent a year for that time period. Assuming the same rate of reduction (absent any further regulation), for the seven-year period from 1996 to 2003 (implementation date of the SCM), VOC emissions from architectural coatings would fall a further 8.4 tons - almost the entire amount targeted by the SCM. This directly contradicts the Draft EIR's assumption that "without additional architectural coating regulations, the inventory for architectural coating emissions will increase due to population growth." The internal inconsistency of the Draft EIR on such a crucial point demonstrates the need for further consideration of the SCM and its projected impacts.

Response: (a) California's 17 districts with architectural coating rules in place that are more stringent than the National Rule comprise 96 percent of the State's entire population. Thus, the emissions benefit that could result from the National Rule in the remaining 18 districts, which only comprise four percent of the State's population, is negligible.

(b) The ARB disagrees with the commenter's assertion that significant reductions in VOC emissions from architectural coatings will result without further regulation. During the six year period between 1990 and 1996 the U.S. EPA national architectural coatings rule was under development with the coatings industry. The U.S. EPA's national architectural coatings rule became effective in September 1999. In California, eleven (65 percent) of the 17 districts with architectural coating rules made at least one amendment to their rules between 1990 and 1996. In addition, during this same period the SCAQMD's Architectural Coatings Rule 1113 was amended eight times. So the commenter's implication is unfounded that emissions naturally declined during a period when no regulation occurred. The remaining argument regarding emissions and their estimated natural decline from 1996 through 2003 (absent any further regulation) is predicated on an assumption that cannot be proven. The California statewide emission inventory is divided into mobile, stationary, and area sources. Architectural coating emissions are accounted for in the area source portion of the statewide inventory. As other emission sources reduce their contribution to the emissions inventory via regulation, the relative contribution of architectural coatings is expected to increase with time and population growth in the absence of further regulation.

15-11. Comment: The Draft EIR's reliance on the ARB survey and the NTS performance study to demonstrate the technological feasibility of the SCM's VOC limits is flawed. In particular, the Draft EIR's conclusion that the VOC limits are feasible is based primarily on the fact that there are some currently available coatings that comply with the proposed limits, and can adequately perform the full range of applications required of these coatings. The survey and NTS study do not provide adequate basis or justification for rule development based on the proposed SCM.

Response: The commenter is referred to the response to Comment #4b-1 of the Final Program EIR for a description of the information utilized in our technology assessment, as well as our economic analysis. As discussed in that response, we did not rely solely on survey data, on the number of complying products found, or on limited application and substrate requirements. We performed a detailed assessment based on many sources of information. We cite the detailed data analysis in Chapter VI of the Staff Report, and in Appendix E of the Final Program EIR. In addition, the NTS data are analyzed in Appendix E of the Staff Report. We believe that the totality of the evidence is sufficient for the districts to develop rules based on the proposed SCM.

15-12. Comment: (a) The 1996 survey is flawed because respondents for a number of reasons miscategorized many coatings. In some cases, manufacturers were simply unfamiliar with the definition and rationale for a given category. For example, a large volume of waterborne primers, sealers and undercoaters was miscategorized as "Quick-Dry Primers, Sealers & Undercoaters” based on the dry-time included in the definition of that category. In other cases confusion was generated by including in the survey form approximately 20 categories defined in the U.S. EPA's new national rule for architectural coatings, but not found in local district rules.

(b) Even had all the products been correctly categorized, however, the survey still fails to provide reliable guidance on appropriate VOC content limits, because the survey collected no performance data on the coatings subsumed under each category. The arbitrary breadth of the major coating categories results in aggregation of many coatings that differ widely in composition, specific intended use, performance characteristics, and VOC content. As the basis for its conclusion that the SCM's VOC limits are feasible, the Draft EIR appears to assume that all coatings within a category are interchangeable. In fact, the various products within a category are not interchangeable. In general, coatings at the lower end of the VOC range are not adequate substitutes for all coatings at the higher end.

Response: (a) The ARB disagrees with the commenter’s assertion that the 1996 survey is flawed. The survey used category definitions consistent with those found in the national U.S. EPA architectural coatings rule and local district rules in California. The definitions found in these rules were developed with industry’s input. During development of the 1998 survey, the ARB worked with the coatings industry to improve the overall comprehension and quality of the survey. The additional categories found in the U.S. EPA rule are merely subcategories of those found in local district rules. The definition for quick-dry primers, sealers and undercoaters is not only consistent with the U.S. EPA national architectural coatings rule, but also local district rules in California. Architectural coatings rules have been in place in California since the early 1970s. In addition, the industry is aware that coatings must undergo a dry time determination performed by using the American Society for Testing and Materials (ASTM) test method D1640 to qualify for the quick-dry primers, sealers, and undercoaters category. No evidence has been presented that supports the comment that "a large volume of waterborne primers, sealers and undercoaters was miscategorized as Quick Dry Primers, Sealers, & Undercoaters."

The ARB also engaged in extensive Quality Assurance and Quality Control (QA/QC) of the data by contacting virtually every company who submitted data to clarify any data records that appeared to be in error (*e.g.*, VOC content, coating category type). The ARB released several drafts of summarized survey data to industry in January 1998 for review and comment. In March 1999, the ARB held a formal public workshop requesting comments on the architectural coatings survey “draft report” released in February 1999. After careful evaluation of all comments received on the draft survey report, the ARB published a final report in September 1999.

(b) The design of the 1998 ARB survey satisfied its intended goal, which was to primarily capture sales volume, VOC content, and ingredient information for products sold in California. The collection of performance data was beyond the scope of the

1998 survey, but was taken into consideration in the technical analysis of the feasibility of the proposed VOC limits. The commenter is well aware that the survey is only one of many sources (*e.g*., performance data, complying products, manufacturer comments, SCAQMD NTS Performance Study, *etc*.) relied upon by ARB staff when evaluating the technical and commercial feasibility of a proposed limit. ARB staff did evaluate the availability of coatings to satisfy required performance characteristics within each category and concluded that complying products were available that were capable of providing overall equivalent performance.

15-13. Comment: The proposed 150 g/l VOC limit for non-flat coatings is technologically infeasible. The coatings with the best performance characteristics (durability and resistance to the following: deterioration by water, corrosion, physical contact, loss of adhesion, erosion, film cracking, discoloration, household chemical attack, and the effects of sunlight) require “hard” resins that must be formulated with VOC levels above 200 g/l to achieve maximum performance. The low-VOC resins cited in the NTS study at best show good block resistance. The discussion of non-flat coatings in Appendix D is misleading. The NTS study shows that flow and leveling characteristics are superior for alkyd paints (>350 g/l VOC) when compared to the water based products (150-250 g/l VOC) and the 150 g/l paints tested did not show the highest performance levels achievable. The qualities claimed by manufacturers for their products are marketing terms that de-emphasize compromises made necessary by excessively stringent VOC content limits and do not indicate a guarantee of the ultimate of performance.

Response: Due primarily to enforcement concerns for districts with more limited resources than the SCAQMD, a subcategory for high gloss non-flat coatings has been created with a proposed 250 g/l VOC limit. (See Comment #1-3 of the Final Program EIR.) However, we disagree with the commenter’s claim that high quality low and medium gloss coatings cannot be formulated at 150 g/l with current technology. Our conclusion is based on laboratory performance tests viewed in conjunction with information published by coatings manufacturers.

Specifically, the laboratory tests conducted by NTS show comparable performance for lower VOC non-flat coatings when compared to higher VOC non-flat coatings in many performance areas listed by the commenter. For the purposes of staff’s evaluation of non-flat coatings, it was appropriate to compare coatings that comply with the proposed 150 g/l limit with higher VOC coatings that comply with the most common current California district limit of 250 g/l. The high VOC coatings (> 350 g/l) mentioned by the commenter would not be allowed under current district rules for non-flat coatings, and were thus excluded from that comparison. Moreover, most of those high VOC coatings (> 350 g/l) tested were “quick-dry enamels.” Such coatings must meet specific gloss and dry time criteria, and are classified in a separate category from non-flat coatings. It is only appropriate to use the NTS results for those coatings in the context of evaluating the proposed VOC limit for the quick-dry enamel category, as was done by ARB staff.

Our survey of product information sheets indicates that there are a number of complying interior and exterior low and medium gloss coatings that are identified by their manufacturers as premium quality coatings. Further, the product information indicates that there are complying coatings that are described as having superior durability and that have excellent performance in the other areas listed by the commenter. Regarding using product data sheets published by coating manufacturers, we believe it is appropriate to use such information in conjunction with test results and other information in our assessment. Coating manufacturers publish the product data sheets to provide customers with information regarding important characteristics of their coatings. The information contained in the product data sheets is typically based on laboratory tests and may also be based on field studies. The commenter states that the product information sheets are simply marketing tools and do not guarantee performance. We believe that customers rely on the information contained in the sheets to assist them in choosing products, and that providing inaccurate information as a marketing tool does not make good business sense. Also, more credence is given to the information contained in product data sheets when similar performance claims are made for complying and non-complying products, and when different manufacturers make similar performance claims for complying products.

15-14. Comment: (a) Alkyd based primers, sealers, and undercoaters at 350 g/l are more forgiving to certain surfaces, *e.g.*, wood prone to bleed through, rusty metal and chalky surfaces. Products at 200 g/l and less are satisfactory, in most cases, only when a very clean, uncompromised surface is available.

(b) General alkyd based wood primers need at least 380 g/l to effectively protect natural wood surfaces.

(c) Alkyd and other solvent borne primers, sealers, and undercoaters for man-made synthetic woods and other composite building materials may need >400 g/l coatings because of their unique surface chemistries and physical profiles which are difficult to adhere to.

Response: (a) Products intended for use on the surfaces indicated would not be categorized as primer, sealer, undercoater products. Products intended for use on substrates to block stains (such as extractive bleeding) or to condition excessively chalky surfaces are considered specialty primers, sealers, and undercoaters, which has a proposed limit of 350 g/l. The 350 g/l limit is consistent with existing limits in district rules. Products intended for use only on rusty metal substrates would fall under the rust preventative coatings category, with a proposed limit of 400 g/l. For further information on specialty primers, sealers, and undercoaters, and rust preventative coatings, please refer to Chapter VI of the Staff Report.

(b) With regard to the alkyd based wood primers, please refer to the response to Comment #9b-10 of the Final Program EIR.

(c) With regard to the synthetic wood materials, please refer to the response to

Comment #9b-10 of the Final Program EIR. We have identified many primer, sealer, or undercoater products, identified on their product data sheets as suitable for use on composite building materials, which meet the proposed limit of 200 g/l.

15-15. Comment: The category of industrial maintenance is too broad for one VOC limit. The types of resins, surface conditions where coatings are used, and cost of coverage per year of service should be considered. Two-component epoxy coatings complying with a 250 g/l VOC limit are adequate for tank linings or concrete, but a single-component polyurethane coating with a VOC content above 250 g/l may be best for resistance from ultraviolet degradation.

Response: See the response to Comment #10-1 of the Final Program EIR. In the Draft Program EIR, we considered resin types, surface preparation needs (proper surface preparation is crucial for all high-performance coatings), coating coverage, and coating durability. Available test results indicate that low-VOC coatings are durable. Along with coating coverage data and the cost information we were able to obtain, we have determined that the suggested factors do not warrant different VOC limits. Based on our review of information available for low-VOC coatings, we have determined that industrial maintenance coatings complying with a 250 g/l limit are available to meet industry needs, except for coating application in persistent low-temperature, high-humidity areas along part of the California coast (see the response to Comment #13-4 of the Final Program EIR). In these areas, the opportunity through the year to apply such coatings is extremely limited. We have determined that limited use of 340 g/l coatings is appropriate in these coastal areas, when justified. In addition, we have added five breakout categories from industrial maintenance coatings with higher VOC limits, *i.e.*, antenna coatings, flow coatings, antifouling coatings, rust preventative coatings, and temperature-indicator safety coatings.

For resistance to ultraviolet degradation, two-component polyurethane coatings that comply with the proposed VOC limit of 250 g/l are available. Single-component polyurethanes that comply with a 340 g/l VOC limit may be considered for use in coastal areas, when justified.

15-16. Comment: Using inadequate lower VOC substitutes for higher VOC products would be counterproductive because more coating material will be applied on each job; more thinning solvents will be added to coatings; and more frequent re-coating will be necessary; therefore, more paint will be used and more VOCs emitted.

Response: We disagree that the lower VOC products would be inadequate substitutes for existing higher VOC products. As explained in detail in Chapter VI of the Staff Report, the VOC limits for each of the architectural coatings categories are technologically and commercially feasible by the proposed effective date. Chapter VI discusses the number of products currently complying with the proposed limits, the techniques that can be used to reformulate products to meet the proposed limits, and other data demonstrating the feasibility of the proposed VOC limits. We also disagree with the commenter's assertions that lower VOC paints will result in more coating material applied on each job, more thinning, and more frequent recoating. Each of these issues is addressed in detail in the responses to Comments #15-27 through #15-33 of the Final Program EIR.

15-17. Comment: The ARB survey shows that 28 percent of industrial maintenance coatings comply with the proposed VOC limit of 250 g/l. It is doubtful that the existing coatings that comply can perform adequately to replace all existing high-VOC coatings.

Response: As discussed in Chapter VI of the Staff Report, the available test results show that the performance of low-VOC coatings is similar to the performance of high-VOC coatings. Coatings that comply with the proposed VOC limit of 250 g/l are commercially available for essentially any use and application, and can replace high-VOC coatings, except along parts of the California coast (as discussed in the response to Comment #13-4 of the Final Program EIR) when coatings with VOC up to 340 g/l may be needed. The commenter is also referred to the response to Comment #15-15 of the Final Program EIR.

The effective date for the industrial maintenance VOC limit is not until January 1, 2004, which provides three and one-half years for coating manufacturers to comply. As discussed in Chapter VI of the Staff Report, several reformulation options are available for the noncomplying coatings. We anticipate that many more complying coatings will be available by the effective date, in addition to the existing ones.

Historically, district rules (except the current South Coast AQMD rule) have considered the rust preventative coatings as industrial maintenance coatings. For that reason, some of the manufacturers of rust preventative coatings included those higher VOC coatings as industrial maintenance coatings in the ARB survey, and thus caused the percent of complying market share to be lower than it actually should be for industrial maintenance coatings. The SCM now includes a “rust preventative” coatings category that is specifically intended to allow limited use of current alkyd coatings. The category is for non-industrial users (*i.e.* residential, commercial, and institutional users)**.** The VOC limit in the SCM is 400 g/l and is the same as the national limit already in effect for that category.

15-18. Comment: The Draft EIR relies on the NTS study which is divided into three phases: laboratory testing, field application testing, and long term exposure studies. To date, only the first phase, laboratory testing has been completed and the data is still undergoing QA/QC review. The Draft EIR mischaracterizes the preliminary laboratory results of the NTS study, saying they “show that when compared to conventional, currently compliant coatings, low-VOC coatings available today have similar application and performance characteristics, including blocking resistance, mar resistance, adhesion, abrasion resistance, and corrosion protection.” The NTS results show that while a given low-VOC alternative product demonstrates similar performance, all these products are deficient in other characteristics. The low-VOC alternatives are less adequate when examined in terms of the total constellation of performance characteristics that coating formulators seek to optimize. (See enclosed article, “Novel Approach to Formulation Modeling,” *European Coatings Journal*, Jan/Feb 2000).

Response: The ARB acknowledges that the NTS field study and long term exposure study have not been completed and are ongoing. As stated in the Draft Program EIR, there is a wide range of commercially available coatings that meet the proposed VOC content limits in the SCM which includes the six coating categories being examined by the NTS study. The ARB used the NTS laboratory data to supplement its findings that the proposed limits in the SCM and products at those VOC levels are capable of providing similar performance when compared to conventional high VOC coatings. The ARB disagrees with the commenter's assertion that the Draft Program EIR mischaracterizes the laboratory data from the NTS study. The ARB stands by its original statement that the NTS Study (laboratory portion) revealed that low VOC coatings exhibited similar performance when compared to conventional high VOC coatings. The low VOC alternatives or coatings examined in the NTS study were not less adequate in the context of tests that were performed for each of the categories examined. The variety of tests selected for each category in the NTS study was tailored to reflect desirable performance attributes relative to the category. The article "Novel Approach to Formulation Modeling" is an interesting approach to formulating products, but only when, as stated by the author, sufficient data exist to allow adequate computer modeling.

The commenter is reminded that the Technical Advisory Committee (TAC) reviewed, selected and approved all test methods and protocols used for the NTS study. The NTS contractor performed all tests as outlined by assigned test methods or protocols. The TAC, which is primarily composed of members of industry, but also includes SCAQMD, ARB, and one environmental group, has presided over the NTS project since the beginning. The TAC was involved in all aspects of the project including project design, selection of the contractor, coatings to be tested, and ongoing status meetings to address any unpredicted issues. The commenter is referred to Appendix E of the Staff Report for an analysis of the NTS study results.

15-19. Comment: The Draft EIR's description of ozone formation is oversimplified and misleading. The Draft EIR does not adequately address the role of NO_x emissions and NO_x transport throughout California in ozone formation, which is critical to determine the environmental effects of VOC emission reductions. The Draft EIR incorrectly implies that VOCs always contribute to ozone formation. The Draft EIR should explain the roles of NO_x, VOCs, and other atmospheric factors on ozone formation under the variety of atmospheric conditions in California throughout the year.

Response: The description of ozone formation and destruction contained in pages IV-76 through IV-79 of the Draft Program EIR contains adequate information on all of the relevant events that result in the production or destruction of ozone. The Draft Program EIR clearly acknowledges that under most conditions VOCs will promote ozone formation, but it also mentions that under specific conditions, some VOCs can act as NO_x sinks and, therefore, limit the amount of ozone formed (see discussion on page IV-79 of the Draft Program EIR). A discussion of the role of NO_x levels in determining the reactivity of VOCs is contained on pages IV-76 to IV-79 of the Draft Program EIR. The commenter is referred to the response to Comment #15-39 of the Final Program EIR for a discussion of negative reactivity, the relationship between NO_x and VOCs under different atmospheric conditions, and NO_x transport.

15-20. Comment: Water delivery systems in California are painted with a coating that is intended to last several years. If the integrity of these coatings is reduced, repainting at significant costs will be needed. The ability to pay for this is questionable, with the degradation of the delivery systems being negatively impacted.

Response: As stated in the response to Comment #15-33 of the Final Program EIR, the best available data indicate that low-VOC coatings for industrial maintenance applications have comparable durability overall to their higher VOC counterparts. ARB staff has worked closely with representatives of "essential public services" agencies such as municipal water districts in developing the proposed VOC limit and effective date for industrial maintenance coatings in the SCM. Due in part to these discussions, we have provided an extra year for industrial maintenance coatings to allow for testing and approval of lower VOC products for use on water delivery infrastructure. Essential public services agencies are currently testing low VOC coatings for water delivery systems. We will review and discuss the results of these tests as they become available and will conduct a technology assessment one year prior to the implementation of the 250 g/l limit for these coatings that is effective on January 1, 2004.

15-21. Comment: Decreased coating quality will result in more painting, and will place more strain on municipal wastewater treatment facilities and landfills.

Response: The commenter is referred to our analysis of impacts on publicly owned treatment works and landfills on pages IV-88 through IV-93 and IV-101 through IV-103 of the Draft Program EIR, respectively, and to our analysis of the more frequent recoating issue on pages IV-70 through IV-71 of the Draft Program EIR. Based on our technology assessment of over 60 categories of architectural coatings, we conclude that lower VOC coatings will work as well as conventional coatings, and that more frequent repainting will not occur. Consequently, there will be an insignificant change in the amount of wastewater to be diverted to POTWs, and there will be no significant increase in the amount of solid waste diverted to landfills if the SCM were implemented throughout California. The commenter has submitted no additional data to substantiate his claim of adverse impacts in these areas.

15-22. Comment: School budgets and child safety will be adversely impacted. The cost of more frequent repainting may be prohibitive, causing some structures to degrade. This may place children in structures that are not as sound as they otherwise would be.

Response: As stated in the Draft Program EIR and the response to Comment #15-33 of the Final Program EIR, coatings reformulated to the proposed VOC limits in the SCM will be comparable in performance to existing coatings. Therefore, more frequent recoating will not be necessary, and school budgets and child safety will not be adversely impacted.

15-23. Comment: Replacing commonly used solvents through reformulation will lead to increased hazards. Acetone is touted as a replacement solvent, but it is a hazard to homeowners. Coatings containing the most dangerous VOCs are typically handled by contractors, and the proposed SCM will force new and unproven technology on do-it-yourselfers.

Response: The commenter is referred to our analysis of this issue on pages IV-94 through IV-107 of the Draft Program EIR. We disagree that reformulation by replacement solvents such as acetone will increase hazards to do-it-yourselfers. The Uniform Fire Code lists equal relative fire hazard ratings to acetone, butyl acetate, methyl ethyl ketone, and xylenes. Increased use of acetone will generally be balanced by reduced usage of equally or more hazardous solvents such as methyl ethyl ketone, toluene, and xylene. Also, we have no evidence that more hazardous diisocyanate-containing two-component coatings will be forced on do-it-yourselfers by the lower limits in the proposed SCM.

In the Final Program EIR, we are proposing some changes to the SCM relating to this issue. We are proposing that the 400 g/l VOC limit for rust preventative coatings be extended to all non-industrial users. We are also proposing to increase the VOC limit for floor coatings to 250 g/l to improve the ease of application for do-it-yourselfers, and increase enforceability. For more information on these changes, please refer to Chapter VI of the Staff Report.

15-24. Comment: (a) Because of the variety of climates in California, the EIR should propose a more sophisticated approach than one-size-fits-all. The SCM may cause different effects in each region, such as those related to biogenic VOCs and negative reactivity. The existing setting should describe each airshed and how the SCM will impact each on a seasonal basis. The analysis would show that architectural coating regulations are not necessary in many regions, and that the SCM will not reduce ozone throughout California. The Draft EIR is too general to describe the effects of the SCM, and does not meet CEQA requirements to fully address the environmental impacts of the SCM. The Draft EIR does not address the need for, and the ability of, currently available compliant coatings to perform under extreme climatic conditions including heat, cold, humidity, rain, and pollution.

(b) The DEIR did not take into account regional and climatic factors, such as air basin characteristics and seasonal impacts. The DEIR did not discuss how existing coatings that already comply with the proposed VOC limits perform under extreme climatic conditions, including heat, cold, humidity, rain, and pollution.

Response: (a) The commenter is referred to the response to Comment #15-1 of the Final Program EIR for a discussion of how we analyzed regional effects. The commenter is suggesting that ARB evaluate the impacts of the SCM not only on regional effects, but also on seasonal effects in each region, including biogenic emissions and negative reactivity. This is coupled with variable VOC and NO_x concentrations, as well as topographical and meteorological conditions that vary not only throughout California, but also on a daily basis.

The reasons that regional and seasonal regulations were found to be infeasible alternatives are discussed in the Draft Program EIR on pages V-139 through V-140. As described therein, due to enforcement concerns, the districts could not regulate coatings based on seasons or regions, and it would place an unacceptable burden on most manufacturers to be required to rotate their stock on a seasonal basis. It is even difficult for some manufacturers to distribute their products on a regional basis, *i.e.*, sending different products into districts with different VOC limits. Instead, some national manufacturers provide products that comply with the lowest district limit for all of California, even in districts without an architectural coatings rule. It will be up to each district to decide whether it is necessary to adopt the SCM to achieve additional emission reductions to attain the State and federal ozone air quality standards. In fact, districts in attainment for the State ozone standard may not adopt an architectural coating rule based on the SCM (although the National Rule is in effect). But we believe our analysis in Chapters IV and V of the Draft Program EIR show that the SCM will reduce ozone in districts that do adopt rules.

The Draft Program EIR addresses the need for, and the ability of, currently available compliant coatings to perform under varying climatic conditions. An analysis of climatic conditions was included in the technology assessment for industrial maintenance coatings. Based on this assessment, the proposed SCM would allow for limited use of industrial maintenance coatings up to 340 g/l in the San Francisco Bay Area, North Central Coast, and North Coast Air Basins due to persistent fog and cold temperatures. We are also proposing higher VOC limits for bituminous roof coatings and bituminous roof primers to allow for the use of solvent-based coatings in colder areas. We did not receive documentation justifying the need for any other climate-related adjustments to the proposed SCM.

(b) ARB staff disagrees with the commenter’s assertion that regional and climatic factors were not taken into account in the Draft Program EIR. We are proposing limited use of 340 g/l industrial maintenance coatings that are needed because of regional, climatic, and seasonal factors, in persistent fog and low-temperature areas of the California coast (see the response to Comment #13-4 of the Final Program EIR). Regarding ozone considerations by air basin, we anticipate that the SCM, if approved by the ARB, will be used by the districts based on the extent of the ozone air quality problem and the need for reductions in VOC emissions. This will be determined individually by each district, which has primary responsibility for the control of emissions from architectural coatings.

In terms of performance after they are applied to substrates, available test results and product data sheets show that low-VOC coatings perform similar to high-VOC coatings under varying climatic conditions.

15-25. Comment: (a) The Draft EIR nowhere estimates the SCM's actual effect on ozone levels. This is probably because the 11.3 tons per day VOC reduction contemplated by the SCM, even if achieved, will have virtually no effect on ozone levels.

(b) To portray the SCM as effective and substantial, the Draft EIR attempts to justify it by indicating the absolute tonnage reduction and the percentage reduction from existing architectural coatings VOC emission levels. Although this indicates the SCM could substantially reduce the percentage content of VOCs in architectural coatings (with extremely high attendant costs for manufacturers and consumers), the Draft EIR's analysis does not indicate what percentage of the overall VOC emission inventory will be reduced by the SCM. In fact, according to the Draft EIR, the 11.3 tons/day decrease represents a miniscule 0.3% decrease in the overall anthropogenic VOC emission inventory.

(c) (Footnote 6): The overall VOC inventory is reported to be 3200 tons per day.

Response: (a) The ARB disagrees with the commenter's statement about the SCM's effect on ozone levels, especially in light of the fact that no evidence is provided to substantiate the claim. To the contrary, data support a conclusion that mass-based VOC control strategies have been and continue to be an effective means to reduce the formation of ground level ozone. As shown in Table IV-5 of the Draft Program EIR, between 1980 and 1998, the number of days that the South Coast Air Basin has exceeded the federal ozone standard has decreased from 167 days in 1980 to 60 days in 1998. During this same period, the maximum one-hour ozone concentrations have decreased from 0.49 parts-per-million (ppm) in 1980 to 0.24 ppm in 1998. Virtually all of the emission reductions were due to mass-based control of VOCs and NO_x. In one study, Fiore *et al.* ("Long-Term Trends in Ground Level Ozone Over the Contiguous United States, 1980-1995," *Journal of Geophysical Research* 103:14871-80, 1998) it is suggested that decreasing trends in ground-level ozone from 1980 through 1995 are attributed to emission controls. It is a well documented fact that VOCs and NO_x react in the presence of sunlight to form ozone. The rate of ozone generation is related closely to the rate of VOC production as well as the availability of NO_x in the atmosphere (U.S. EPA, Air Quality Criteria for Ozone and Related Photochemical Oxidants, July 1996, Volume I and III; Seinfeld and Pandis, *Atmospheric Chemistry and Physics*, John Wiley & Sons, New York, 1998). At low ambient concentrations, ozone is a colorless, odorless gas, and the chief component of urban smog. Air quality data have revealed that 75 percent of the nation's exposure to ozone occurs in California (ARB, National Exposure to Ozone, from Terry McGuire to Michael H. Scheible, January 6, 1994). As shown in Figure III-1 of the Draft Program EIR, the population-weighted average exposure to ozone concentrations above the State ambient air quality standard of nine parts per million in the South Coast Air Basin has been declining. However, despite this decline and nearly 25 years of regulatory efforts, ozone continues to be an important environmental and health concern.

(b) The ARB properly characterized the emission contribution from architectural coatings in the "Project Description" section of the Draft Program EIR under "Architectural

Coatings Emission Inventory," pages II-18 & II-19. Emissions from architectural coatings (130 tons per day) represent about eight percent of the total stationary source emissions, and about four percent of all VOC emissions (includes stationary, area-wide, mobile, and natural-nonanthropogenic sources) statewide. The contribution of architectural coating emissions to the inventory is more than all VOC emissions from petroleum refining and marketing combined, and is comparable in size to the VOC emissions from emission categories of pesticides, degreasing operations, and all other coatings.

The Draft Program EIR indicates that the SCM would reduce VOC emissions by 11.3 tons per day outside of the South Coast AQMD which represents 55 percent of the anticipated statewide reductions from the SCM. If the ARB included benefits that would result from the South Coast AQMD Rule 1113, which has similar VOC limits, the total statewide benefits anticipated from the proposed VOC limits are 20.5 tons per day or 0.6 percent out of a total of 3200 tons per day from all sources including stationary, area-wide, mobile, and natural (non-anthropogenic) sources.

(c) Regarding the footnote, the 3200 tons per day value is correct.

15-26. Comment: We raised a number of issues, commonly referred to as the "Seven Deadly Sins," that bring into doubt the draft EIR's conclusion that VOC content limits will result in an overall decrease in emissions from architectural coatings. These issues suggest that stringent regulations like the SCM will lead to substitution of less adequate coatings that require more coats, more priming, more frequent recoating, more touch-ups, and more thinning, to cover the same area for the same period of time as a higher VOC coating. Therefore more paint is needed to do the same job and more VOCs are emitted. The comments also suggest that because the VOCs commonly found in low-VOC coatings often have higher reactivities than the most prevalent VOCs in higher-VOC coatings, regulations limiting the mass content of VOCs may actually result in increased ozone.

The draft EIR's (DEIR) response to these issues is inadequate. First, the DEIR repeatedly misstates industry's position in important ways. Second, the Draft EIR can point to no study supporting its positions. Instead, the Draft EIR's arguments rest on the partially completed NTS study, which has to date yielded no field application or long-term exposure information on low-VOC coatings, sales volume information, and product data sheets, which are little more than marketing materials. None of these is a substitute for a proper analysis of issues raised by industry repeatedly for years, on issues that bear directly on whether mass-based VOC regulations are at all effective, or whether they actually harm the environment.

Response: Each of the issues raised by the commenter is addressed in detail in the responses to Comments #15-27 through #15-35 of the Final Program EIR. As discussed in these responses, we do not believe that the Draft Program EIR misstates the industry's positions. The industry has not always stated the "seven deadly sins" exactly as stated by the commenter. In addition, some of these issues, as stated by the commenter, are outdated and apply to very few products subject to the SCM, making them largely irrelevant. For example, regarding the "More Thickness" issue (Comment #15-27 of the Final Program EIR), the commenter stated that the issue was raised primarily with respect to low VOC high-solids solvent-based alkyd coatings, particularly Nonflats. However, coatings in the Nonflat category are almost completely water-based now, and any remaining solvent-based products would be expected to switch to a water-based formulation rather than a high solids solvent-based alkyd formulation.

We also disagree that the Draft Program EIR can point to no study or proper analysis to support its positions. We provide a variety of information to support our positions in the Draft Program EIR. This information includes performance testing by independent contractors (the "NTS" and Harlan Associates studies), studies to determine thinning practices by contractors in the field, product data and technical sheets, product labels, the architectural coatings survey data, and discussions with manufacturers and resin suppliers. The commenter criticizes some of these sources of information. However, we believe that in combination they substantiate our positions. By contrast, the commenter provides no information to substantiate their claims.

15-27. Comment: Contrary to the Draft EIR's characterization, industry representatives did not contend that low-VOC waterborne coatings tend to produce thicker films. This issue was raised primarily with respect to low-VOC high-solids solvent-based alkyd coatings, particularly nonflats. This also applies to two-component high-build Industrial Maintenance Coatings, which are purposely formulated to produce thicker films. The Draft EIR's misstatement of industry's position allowed the inclusion of data on waterborne coatings, resulting in the conclusion that there is no relationship between low-VOC levels, thickness, solids, and coverage. Moreover, the draft EIR does not appear to note that coverage rates are a function of coating solids by volume and dry film thickness, which relates to coating viscosity and application method. Low-VOC high-solids solvent-based alkyd coatings typically have high viscosity, and will tend to produce thicker films, increasing VOC emissions per unit of area covered. The Draft EIR does not analyze this impact.

Response: The "thickness issue," as raised by industry, has not always been limited to solvent-based alkyd coatings or two component industrial maintenance coatings as stated by the commenter. The discussion in the Draft Program EIR appropriately considers the reality that water-based coatings constitute a majority of architectural coatings, particularly in the nonflat category mentioned by the commenter, where about 95 percent of the coatings are water-based according to the ARB's architectural coatings survey. As such, it makes sense to analyze this issue with coatings representative of what is now used in the marketplace. The commenter's concerns are limited in scope to a minority of products, and are less relevant now that water-based coatings are so prevalent, and solvent-based alkyd coatings are accommodated in the SCM with relatively high VOC limits in the appropriate specialty coatings categories (such as "rust preventative" and "specialty primer, sealer, and undercoater"). Nevertheless, the commenter's assertion that lower VOC limits will result in thicker coatings and less coverage are not necessarily valid even for the solvent-based coatings. This is because many of the solvent-based formulations will not be reformulated to higher solids alkyds as predicted by the commenter. For example, they may reformulate using exempt solvents that lower the VOC content without increasing solids, or they may reformulate to a water-based system. For example, we expect most existing solvent-based nonflat coatings and quick dry enamels to be reformulated to a water-based system. Even considering the narrow situation described by the commenter, where a solvent-based alkyd or two component formulation is reformulated to a higher solids level, this may not result in a thicker product with lower coverage because the manufacturer may use a less viscous resin that allows the product to be applied in a thinner film. We also note that if the commenter's assertions were valid, sales of architectural coatings would be expected to increase on a per capita basis whenever VOC content limits were raised. In the past, we have not found that sales of architectural coatings, per capita, have increased with decreases in the VOC content limits. In fact, sales per capita have remained remarkably constant since 1988.

15-28. Comment: Regarding the "thinning issue", manufacturers did not assert that thinning occurs in low VOC waterborne coatings, but rather in the same types of coatings that would tend to produce more thickness unless thinned in the field beyond manufacturers recommendations. Coverage rates shown in Table IV-2 are taken from product labels or data sheets, which generally indicate theoretical coverage at the recommended dry film thickness, although actual dry film thickness may vary as applied. In addition, CARB's 1991 field study of thinning practices cited in the DEIR is seriously flawed because: (1) only 49 of 121 coatings observed were tested; (2) 18 of the 49 coatings were waterbased and would not be thinned with solvents; (3) four of the remaining 31 coatings were thinned in excess of the VOC limits; (4) painting contractors admitted to being intimidated by the local district personnel performing the field work and were reluctant to disclose actual field-thinning practices; and (5) the study focused on relatively higher VOC specialty coatings that are less likely to be thinned than lower-VOC general purpose coatings.

Response: Although the thinning studies discussed in the Draft Program EIR analyzed both water-based and solvent-based coatings, the studies are still valid for solvent-based paints such as those mentioned by the commenter. Regarding the comment that coverage rates printed on labels and data sheets are theoretical and will vary with application techniques, we believe that they represent good approximations. Since we are comparing data sheets for both high and low VOC products, both using theoretical coverage, the overall comparisons of coverage for low and high VOC products are valid.

The commenter also asserts that the ARB's 1991 "Field Investigation on Thinning Practices During the Application of Architectural Coatings in Selected Districts in California" was seriously flawed. However, the commenter's statements do not support this assertion as discussed below.

- The commenter mentions that only 49 of the 121 coatings observed in the study were tested. However, in accordance with the protocol for the field study, samples were taken when a painter indicated that the coating was thinned with VOC containing material. In addition, district inspectors were encouraged to take samples of other specialty and general purpose architectural coatings if the listed VOC content was greater than allowed or samples were needed to verify compliance. The additional coatings were not sampled because the painters indicated they were not thinned with VOC containing material.

- The commenter's statement that water-based coatings can only be thinned with water was found to be inaccurate in at least one case. During the investigation, we found a water-based coating which was thinned with VOC containing gun-cleaning solvents.

- The commenter indicates that four solvent-based coatings had been thinned in excess of the applicable limit. We listed three of these coatings as being in violation of the VOC limits (Table 2). The fourth coating was within 2.5 percent of the limit and was considered to be in compliance with the limit in accordance with the study protocol and enforcement practice at the time of the study (within 10 percent of the limit to account for laboratory accuracy). It was reported in Table 3 of the report under "Thinned Coatings in Compliance."

- The statement by the commenter that "four of the remaining 31 solvent-based coatings (*i.e.*, 13 percent) had apparently been thinned to excess of applicable limits" is an inaccurate and invalid comparison because it excludes other solvent-based coatings that were applied without thinning with VOC containing material.

- The assertion that having enforcement personnel conducting the investigation resulted in reluctance on the part of the painting contractors to disclose actual field-thinning practices is unsupported speculation. To our knowledge, the inspection reports for this study documenting the comments from the actual painters have never been compared to any interviews with painting contractors which are alleged to have been conducted after the study. In fact, the study report (without actual inspection forms) was not released until six months after the completion of the inspections that would have made this comparison difficult. It should also be noted that the inspector would typically arrive during painting and would sample a coating that had already been thinned. The samples taken of both thinned and non-thinned coatings supported the information on thinning practices provided by the painters. We do not have any reason to believe that the painters were reluctant to provide truthful responses to our basic questions on thinning practices.

- The commenter stated that more general coatings should have been tested because they are more likely to be thinned than the relatively higher VOC specialty coatings. However, the general flat and nonflat coatings are virtually all water-based, and the commenter stated the study should focus only on the solvent-based products. During the study, we did not find any general-purpose coating that was identified by the painter as being thinned with VOC containing material.

Finally, the Draft Program EIR also relied on the results of three additional thinning studies performed by the South Coast AQMD. To date, we have not received any data which substantiates industry's claims regarding thinning, although we have repeatedly requested such data.

15-29. Please see comment and response to Comment #15-28 of the Final Program EIR.

15-30. Comment: More primers will be necessary because of the increasing use of low-VOC water-based latex enamels on difficult substrates, including previously enameled surfaces. Such products have demonstrated poorer adhesion than solvent-based alkyd enamels, which will adhere adequately to previously enameled surfaces. As a general precaution, it is generally recommended that difficult substrates to be topcoated with latex enamel be primed first, with either solvent-based or water-based primers. Such priming would be unnecessary with a better adhering alkyd enamel. Also, the draft EIR does not address greater use of priming due to the relatively poor sealing and stain-blocking properties of water-based primers.

Response: ARB staff reviewed product data sheets from both high gloss latex and alkyd topcoats and found that they do not substantiate the commenters claim that primers are generally recommended prior to the application of a latex enamel on a previously enameled surface. Generally, product data sheets include similar surface preparation instructions for latex and alkyd enamels. Specifically, it is recommended for either type of enamel that glossy surfaces be sanded or etched to roughen the surface and promote adhesion. In addition, data sheets for complying high gloss latex enamels list features such as "excellent adhesion to aged enamels" and "excellent adhesion even to difficult surfaces." In addition, as stated in the Draft Program EIR, if a trend had developed where more primers were being used prior to the application of low VOC topcoats, the survey data would be expected to reflect this trend as an increase in the per capita use of architectural coatings for past regulatory efforts. Such a trend has not been observed. Finally, the commenter states that the Draft Program EIR does not address greater use of priming due to the relatively poor sealing and stain-blocking properties of water-based primers. However, the proposed SCM includes a higher VOC category for "specialty primers, sealers, and undercoaters" that addresses this exact issue by allowing higher VOC primers with better sealing and stain-blocking properties.

15-31. Comment: (a) Contrary to the DEIR's statement, manufacturers and contractors do not assert that low-VOC solvent-based topcoats may not cover, build or flow-and-level as well as higher-VOC solvent-based formulations, but rather that water-based latex topcoats exhibit deficiencies is [*sic*] these areas.

(b) Reliance on the preliminary laboratory data from the NTS study is particularly misguided because one of the major flaws of this portion of the study was that all testing panels were prepared by the draw down method rather than typical real-world application methods such as brush, roller, or spray.

(c) The draft EIR's reliance on the Ventura County APCD study is also misplaced. Paint manufacturers and contractors strongly disagree with the conclusions of the study. The study was severely limited in:

> (1) The number and type of applications each product tested: The study was generally limited to one application of the water-based coatings tested, and the specific applications selected avoid the conditions most associated with failure of water-based coatings, for example: application of latex enamel over surfaces previously enameled with high-gloss alkyd enamel; application of exterior latex primer and/or enamel over chalky, oxidized substrates; application of interior latex primer and/or enamel to substrates contaminated with residues of oil, grease, or wax; and application of latex sealer to surfaces marked with water soluble stains. Also, none of these coatings tested were subjected to the range of extreme exposure conditions that industrial maintenance coatings are formulated to resist;
>
> (2) The timeframe of the tests: The six month timeframe of the testing project was far too limited to allow for evaluation of long-term durability of the substitute products as compared to higher-VOC products. Durability is the single factor most related to frequency of repainting; and
>
> (3) The range of product tested: The study tested almost exclusively water-based coatings that might be used as substitutes for higher-VOC Quick-Dry Enamels, QD primers, industrial maintenance coatings, and lacquer coatings, the performance problems of which are of a different nature than those associated with complying solvent-based coatings that are often the preferred substitute.

(d) The draft EIR’s assessment of coatings technology “breakthroughs” is unrealistically optimistic, and is not supported by industry experience.

(e) In the NTS study, the industrial maintenance topcoats were not subjected to and tested for the range of extreme exposure conditions that industrial maintenance coatings are formulated to resist.

<u>Response</u>: (a) Even considering only the low VOC water-based nonflat latex products, the NTS testing did not demonstrate deficiencies in coverage, build, or flow-and-leveling for water-based latex products.

(b) The NTS testing of flow and leveling using the draw down method is appropriate even though paint is applied in different ways because it measures flow and leveling in a precise standardized fashion that is indicative of flow and leveling in actual use. The commenter also fails to mention that the NTS study included a test of brushing properties using the Federal Test Method Standard Method 4321.2. Under this test, complying high gloss latex paints were found to have similar brushing properties when compared to solvent-based quick-dry enamels.

(c) The commenter criticizes the Ventura County APCD’s study as being too limited, yet provides no specific evidence to support its position. With regard to the concern that the testing did not include the application of latex coatings on high gloss alkyd enamels, chalky oxidized substrates, and substrates contaminated with residues of oil, grease or wax, the commenter is inappropriately asking for application of paints to poorly prepared surfaces that would not be appropriate for any topcoat. Specifically, manufacturers of any topcoat will generally recommend that glossy surfaces be sanded or etched, and that all chalk, oil, grease, or wax be removed prior to the application of topcoats.

Regarding the concern that the testing did not include the application of latex sealers to surfaces marked with water soluble stains, and that the coatings were not subjected to the range of extreme exposure conditions that industrial maintenance coatings are formulated to resist, it seems unreasonable to expect any test to examine all possible exposure conditions that could conceivably be encountered.

With regard to the concern that the six month evaluation timeframe is too short, it seems appropriate in responding to the commenter's concern, as stated in the Draft Program EIR, that whether or not more topcoats will be needed because of poor coverage, build, or flow-and-level, would be apparent shortly after application.

Finally, with regard to the concern that the study used low VOC water-based paints, we should first note that there are few solvent-based coatings currently meeting the proposed VOC limit of 250 g/l for industrial maintenance coatings. That is reflected accordingly in the NTS study. The coatings and tests that were used in the study were selected by an advisory committee comprised mostly of coating industry representatives. Even if the commenter is correct in that some users may want low-VOC, solvent-based paints as the preferred substitute, the results of the study provide convincing evidence that the transition to low-VOC, water-based coatings will be essentially transparent to most consumers since the study showed that current low-VOC, water-based coatings performed well and did not require the use of additional topcoats.

(d) The commenter states, without specific supporting evidence, that the Draft Program EIR's mention of technology breakthroughs over the last few years are overly optimistic. However, the specific technology advances are detailed in the Draft Program EIR and are not challenged in any meaningful way by the commenter.

(e) The NTS study was intended to compare the performance of low-VOC and high-VOC industrial maintenance coatings by subjecting them to the same standardized tests. The purpose of the NTS study was not to test for every possible extreme condition. Industrial maintenance coatings have varied uses and thus varied performance characteristics. For example, a topcoat may be formulated for resistance mainly to one or several of the following types of exposure: chemical vapors, ultraviolet light, salt air, substrate temperatures from 250º F to 400ºF, or heavy abrasion. To cover these characteristics, the number of coatings and tests needed for extreme conditions would be considerable. While such testing may be of specific interest to some users, the results would not be useful for our purpose in comparing the performance of low-VOC and high-VOC coatings, in general.

The coatings and tests chosen for the NTS study were selected by an advisory committee, in which most of the members are from the coating industry.

15-32. Comment: Manufacturers and contractors do not assert that water-based formulations dry slowly and are susceptible to damage such as sagging, wrinkling, alligatoring, or becoming scraped or scratched. These problems were noted with regard to low-VOC high solids solvent-based alkyd enamels. Moreover, as indicated above, the DEIR's reliance on manufacturer-produced marketing materials cannot substitute for scientific technical analysis. The preliminary laboratory data from the NTS study is also inadequate for evaluating the coating deficiencies that result in more touch-ups and repair work under real-world application conditions.

Response: We do not envision a trend toward reformulation to high solids alkyds as explained in the response to Comment #15-27 of the Final Program EIR. Therefore, it is appropriate to consider both solvent-based alkyd and water-based latex technologies in the analysis in the Draft Program EIR. Many of the proposed limits in the SCM are designed specifically to accommodate solvent-based alkyds for the applications where they are desirable, such as rust preventative coatings and specialty primers, sealers, and undercoaters. However, manufacturers can make low-VOC water-based coatings if they cannot produce low-VOC solvent-based coatings that meet their performance criteria.

We also believe it is appropriate to use information on data sheets in conjunction with other information as discussed in the response to Comment #15-13 of the Final Program EIR. The commenter states that the information provided on manufacturer data and technical sheets are for "marketing" purposes and are not a replacement for scientific technical analysis. Then the commenter states that the results of the NTS study, which the industry was involved with in designing, are inadequate for evaluating the coating deficiencies that result in more touch-ups and repair work under real-world conditions. Yet, this is the scientific technical analysis the commenter says is needed.

While criticizing the NTS study in broad and general terms, the commenter does not explain why it feels the NTS results are inadequate and provides no information to support its claims. By contrast, ARB staff has proposed VOC limits developed from extensive discussions with industry and which generally accommodate numerous types of water-based and solvent-based technologies. In proposing these limits, ARB staff relied on detailed, scientifically sound studies designed with industry involvement, information obtained through surveys, product labels, technical data/specification sheets, meetings with industry representatives, and extensive technical literature searches.

15-33. Comment: The preliminary laboratory testing phase of the NTS study was never intended to address the long-term performance issues that relate to more frequent recoating. This is precisely why the NTS study also includes a long-term exposure study phase, which has yet to be initiated. Moreover, coating durability is not simply a question of high-VOC versus low-VOC products. Different types of coatings, formulated from a wide variety of resins, solvents, and other components, characteristically have different levels of VOC content and correspondingly different sets of performance attributes, which make them suitable for different purposes. Coatings that typically have lower VOC content may be fully adequate for certain uses, and yet be utterly inadequate as substitutes for coatings that might be banned on the bases of the higher VOC content. Therefore, while VOC content is not the sole determinant of coating performance, some optimum amount of VOC is necessary to achieve maximum performance in any given type of coating. If a VOC content limit is set below the optimum amount for a particular coating use – as the proposed SCM will require – performance of available substitutes is inadequate, service life is shortened and frequency of recoating is increased. The Draft EIR makes no attempt to analyze this issue by identifying specifically which coatings would be banned by the proposed limits, what the likely substitutes would be, and their respective performance characteristics.

Response: As discussed in the Draft Program EIR, the best available data indicate that low-VOC coatings for both architectural and industrial maintenance applications have comparable durability overall relative to their higher VOC counterparts. While we agree that coating durability is not simply a question of high-VOC versus low-VOC products, we disagree that the VOC limits will ban products and result in inadequate performance, shortened service life, and greater frequency of recoating. First, we note that, as in many of the commenter's previous comments, no specific data were submitted to support the contention that lower VOC coatings will be less durable than higher VOC coatings. Second, the proposed SCM contains over 40 different coatings categories with VOC limits that are designed to accommodate each type of architectural coating. ARB staff developed these categories and limits through extensive work with the industry, providing them with an opportunity to demonstrate whether certain types of products would be adversely affected by the proposed limits. Based on these discussions, ARB staff modified their original proposal to add some additional categories of coatings to the proposed SCM. Finally, we note that this same comment regarding more frequent recoating was raised during past regulatory efforts to reduce VOC emissions from architectural coatings. However, our architectural coatings surveys in the 1990's have not shown any increase in per capita sales volumes that would indicate more frequent recoatings due to the use of reformulated coatings. Thus, empirical data on the California coatings market simply do not support the contention that reformulated coatings are generally inferior in durability to higher VOC products.

As is standard practice with nearly all recently-adopted ARB regulations, we will propose in the Board Resolution that we conduct a technology review(s) of industry's progress to meet the 11 proposed limits that are lower than the predominant VOC limits in existing district rules prior to their implementation dates. This will ensure that any necessary changes to the VOC limits can be made, if necessary.

15-34. Comment: The tremendous variety of architectural coatings available today exists because of market demand for cost-effective solutions to specific performance needs. When a VOC content limit bans the best performing coatings in a given category, substitutes are likely to come from another category, which may have a higher VOC content limit, thereby circumventing the regulation and eliminating the projected VOC emission reductions. The nature of markets is to seek the greatest value from the widest possible range of options. The Draft EIR makes no attempt to analyze factors that will determine substitute product selection within the context of all remaining architectural coatings after implementation of the proposed SCM. Instead, the Draft EIR incorrectly assumes that the level of usage of each category will remain constant.

Response: As discussed in the Draft Program EIR, proposed VOC limits for each of the coating categories in the SCM are technologically and commercially feasible. In most cases, there is a substantial market share of complying products already meeting the applicable limits. The NTS study also demonstrates similar performance overall when comparing the lower VOC and higher VOC products. Therefore, we do not believe the proposed limits will ban the best performing products or result in the substitution of higher VOC products designed for another use.

15-35. Comment: The Draft EIR does not comprehensively determine the effects of VOC emission reductions across the air districts of California. It ignores differences in reactivity among VOCs, airsheds, and seasons. It incorrectly concludes that the SCM will not lead to substitution of more reactive VOCs, and that it will not cause increases in ozone levels because of negative reactivity.

Response: The commenter is referred to the response to Comment #15-39 of the Final Program EIR for a discussion of negative reactivity and regional effects, and to the response to Comment #15-37 of the Final Program EIR for a discussion of substitution of more reactive VOCs in water-based coatings.

15-36. Comment: The Draft EIR first argues that although propylene glycol (a primary VOC in water-based coatings) is two to three times more reactive than “a typical mineral spirit used in solvent-based coatings,” it is less reactive than some VOCs used in solvent-based coatings, such as toluene and xylenes; therefore, its increase use should not increase ozone levels (Id. a IV-73). But the Draft EIR does not mention that mineral spirits compose 80% of VOCs in solvent-based coatings, whereas toluene and xylenes comprise only 4.2% (Harley, *et al.* “Respeciation of Organic Gas Emissions and the Detection of Excess Unburned Gasoline in the Atmosphere,” 25 *Environ. Sci. Technol*. 2395-2408 (1992). Therefore, even a significantly smaller volume of propylene glycol in water-based coatings than mineral spirits in solvent-based coatings will have the effect of *increasing* ozone levels due to propylene glycol’s higher reactivity. [emphasis in original]

Response: The commenter is referred to the response to Comment #15-37 of the Final Program EIR, which presents a discussion on the reactivity of the ingredients of water-based and solvent-based coatings. (The commenter misquotes the Harley, *et al.* study, which states that mineral spirits make up 70 percent of the VOCs in solvent-based coatings, not 80 percent.)

15-37. Comment: The Draft EIR misstates the nature of the issue of the reactivities of water-based and solvent-based coatings; the real issue is whether a water-based substitute for a solvent-based product will have equal or greater ozone formation impacts, accounting for differences for both VOC content and VOC reactivity. The comparison in the Draft EIR does not provide strong evidence that reformulating solvent-based coatings to water-based coatings is an effective strategy to reduce ozone formation potential of architectural coatings. This is because the comparison deals with a few categories with currently available coatings that include large volumes of low-VOC water-based coatings, but are not intended as substitutes intended for specific end-uses. For example, water-based primer/sealer/undercoaters (average VOC actual of 41 g/l) includes a large volume of low-VOC water-based latex drywall sealer and a small volume of solvent-based primers for special surfaces (average VOC actual of 345 g/l). The eight-fold difference in average VOC content overwhelms any potential difference in VOC reactivity. However, water-based latex sealers are not a suitable replacement for solvent-based specialty primers; water-based replacements would likely be around 200 g/l. Solvent-based coatings have by-volume solids 1.5 to 2 times higher than water-based coatings, so it takes 1.5 to 2 gallons of water-based coating to replace one gallon of solvent-based product. Most solvent-based products contain only mineral spirits, while water-based products contain glycol compounds, so if glycols are two to three times more reactive than mineral spirits, the water-based replacement at 200 g/l could have as much as 1.74 times more ozone formation potential than the 345 g/l solvent-based product.

Response: We believe that the most appropriate way to compare reactivities, is to compare water-based and solvent-based coatings by looking at the total, or weighted reactivity of a product or product category. To do this weighted VOC profiles were developed for water-based and solvent-based coatings using the ARB survey (ARB, 1998 Architectural Coatings Survey Results Final Report, September 1999). This comparison of species profiles provides strong evidence that reformulating from solvent-based to water-based coatings to reduce total VOC content is an effective strategy to reduce the ozone formation potential from the architectural coatings category as a whole. In fact, the comparison found that, on a weighted basis, solvent-based coatings are over two times more reactive than water-based coatings.

According to the 1998 Architectural Coatings survey, propylene glycol makes up about two percent of the overall speciated inventory (a little over two percent of the water-based inventory), while distillates such as mineral spirits make up about eight percent (or about 65 percent of the solvent-based inventory). Xylene and toluene together total about one percent of the overall inventory (about seven percent of the solvent-based inventory). Xylene and toluene were used as examples because of their high reactivity, not as an indicator of a typical solvent in solvent-based coatings. The reactivity as measured by (MIR) of propylene glycol is 2.75, while mineral spirits range from 0.78 to 1.27, according to Dr. Carter's April 2000 updates (Carter, The SAPRC-99 Chemical Mechanism and Updated VOC Reactivity Scales, App. C, Rev. 4/3/2000, <http://www.cert.ucr.edu/~carter/reactdat.htm>, visited 4/25/00). Thus, the contribution of an average MIR of 1 for mineral spirits at eight percent of the overall inventory outweighs the MIR of 2.75 for propylene glycol at two percent of the overall inventory. On a per gallon basis and accounting for reactivity, the water-based coating has the potential to emit 0.57 pounds of ozone per pound of product while the solvent-based coating has the potential to emit 1.23 pounds of ozone per pound of product.
The examples in the Draft Program EIR appropriately focused on categories that are not currently water-based.

Although the sales weighted average solids content for the categories mentioned are typically higher in solvent-based coatings than in water-based coatings, Table IV-2 of the Draft Program EIR does not confirm the commenter's assertion that the coverage of solvent-based coatings is 1.5 to 2 times that of water-based coatings. For example, in the category cited by the commenter, the highest VOC primer, sealer, undercoaters cover an average of 390 square feet per gallon compared to 415 square feet per gallon for lower VOC products. Therefore, we disagree with the commenter that the difference in solids would mean that it would take 1.5 to 2 gallons of water-based coating to replace one gallon of solvent-based product.

15-38. Comment: Recent work by Dr. Carter cited in the Draft EIR suggesting that mineral spirits may be more reactive than previously thought are actually computer modeled reactivities for certain mineral spirits. This conflicts with Dr. Carter's air chamber reactivity measurements which demonstrate that mineral spirits are either negatively reactive or cause essentially no change in final ozone levels.

Response: Environmental chamber experiments can be used to evaluate the reactivity of a VOC under a limited set of conditions. Chamber experiments have the advantage that they do not depend on chemical mechanism uncertainty. However, reactivities depend on environmental conditions, and it would be impractical to use environmental chambers to attempt to represent the set of conditions present in ambient air.

Computer modeling is necessary to generate reactivity values which reflect atmospheric conditions. Conditions in environmental chambers are not those of the atmosphere (Bergin, *et al.* Reactivity Assessments, 5/5/99, at http://narsto.owt.com/Narsto/reactinfo.html); for example, NO_x concentrations are typically much higher in a chamber than in ambient conditions. To calculate reactivity under atmospheric conditions it is necessary to use computer models. This is how the MIRs used in ARB's reactivity regulations are determined. The observation of negative reactivity in the chamber does not mean that the mineral spirits will be negatively reactive under atmospheric conditions. It is inappropriate to compare experimental reactivity values with MIRs, as these represent very different conditions. Dr. Carter's paper did find small changes in ozone concentrations due to mineral spirits, which is reflected in mineral spirits' relatively low MIR value.

In the most recent work of Dr. Carter (Carter, Documentation of the SAPRC-99 Chemical Mechanism for VOC Reactivity Assessment, Appendix C-1, page C-21, April 11, 2000, at http://cert.ucr.edu/~carter/bycarter.htm), the MIR value of mineral spirits ranges from 0.78 to 1.27. Footnote 26 on page C-26 says that, contrary to the earlier version of the mechanism discussed in the report cited by the commenter, the current mechanism performs reasonably well in simulating the chamber results for the samples tested. In the documentation for SAPRC-99, Dr. Carter assigned an uncertainty code of one for mineral spirits, which means he considers that their "reactivity is not expected to change significantly." Furthermore, as proposed in the ARB's aerosol coating regulation, the Chemical Manufacturers Association says that the ARB's characterization of the reactivity of mineral spirits agrees within 15 percent of the Association's knowledge of these compounds.

15-39. Comment: The Draft EIR acknowledges that VOCs are negatively reactive under certain conditions, but does not indicate when, where, or how often those conditions occur in California. The Draft EIR notes that negative reactivity is not commonly found in ozone non-attainment urban areas, but does not address negative reactivity in the vast majority of the state that is attainment for ozone. The Draft EIR cannot know whether the SCM will result in increased ozone levels without a full analysis of the conditions where negative reactivity occurs and the prevalence of those conditions in California.

Response: The commenter asserts that the Draft Program EIR does not account for regional effects on ozone production. In addition to the comments summarized in Comment #15-39 of the Final Program EIR, the commenter states that the Draft Program EIR does not include adequate analysis of significant effects on air quality and ozone formation throughout California, and that there could be negative or qualitatively different effects of ozone levels in certain regions of the state (Comment #15-6). The commenter indicates that the EIR does not comprehensively determine the effect of VOC emission reductions across the air districts of California (Comment #15-35). Finally, the commenter claims that the EIR ignores differences in reactivity among VOCs, airsheds, and seasons (Comment #15-35).

The commenter mentions negative reactivity throughout his letter, yet he provides very little supporting information. The references cited by the commenter (Seinfeld, *et al.*, *Rethinking the Ozone Problem in Urban and Regional Air Pollution*, National Academy Press, Washington, D.C., 1991, quoting Carter and Atkinson, Computer Modeling Study of Incremental Hydrocarbon Reactivity, *Environmental Science and Technology* 23:864-880, 1989; Carter, *et al.*, Investigation of the Atmospheric Ozone Forming Potentials of Selected Mineral Sprits Samples, July 25, 1997, at http://cert.ucr.edu/~carter/bycarter.htm) simply mention that negative reactivity exists for a few compounds in some VOC/NO_x scenarios. These references do not support the proposition that VOC control will be counterproductive in California nonattainment areas.

Contrary to the commenter's position, we did consider regional and seasonal differences in reactivity and concluded that the Draft Program EIR's approach of uniform statewide VOC limits is the most effective, enforceable, and practical approach to reducing ozone formation from architectural coatings. In the Draft Program EIR, we discussed the fact that high biogenic emissions are emitted in elevated and largely unpopulated areas downwind of the urban areas, and that sustained mixing from above the air basin down to urban centers is required for biogenic emissions to play a significant role in population exposure to ozone (pages II-21 through II-22 of the Draft Program EIR). We also discussed the MIR scale, which is used by ARB for regulatory applications because this scale reflects reactivities under environmental conditions that are most sensitive to the effects of VOC controls (page V-155 of the Draft Program EIR). We also said that a combined strategy of VOC and NO_x controls are used in ARB's fuels and low emission vehicle programs because both VOC-limited and NO_x-limited regions exist in an airshed and, coupled with the changing chemical composition of an air basin, VOC controls or NO_x controls alone are not as effective as a combined strategy (page IV-78 of the Draft Program EIR).

Pursuant to State law, the ARB evaluated the effects of transport on ozone concentrations in downwind areas in 1990. Because atmospheric chemical reactions remove NO_x much faster than they remove VOCs, air masses generally become NO_x-poor downwind. In these air masses, ozone production is limited by NO_x concentrations. Reducing NO_x emissions upwind further reduces the amount of ozone which can be formed in transported air masses. This strategy is supported by ambient ozone trends for monitoring sites in the Southeast Desert Air Basin, which are frequently impacted by transport from the South Coast Air Basin. Decreased ozone concentrations at these sites are correlated with reductions in NO_x emissions in the South Coast Air Basin. State law also requires the ARB to establish mitigation requirements for the control of ozone precursors in upwind areas that are sources of overwhelming or significant transport. While the control of NO_x emissions may sometimes result in ozone increases near the urban NO_x source areas, there are major benefits downwind of these areas. In such areas, additional VOC controls can be used near the source of NO_x reductions to offset increased ozone concentrations. Reducing NO_x emissions also limits the ability of biogenic VOC emissions in rural areas to react with transported NO_x to produce ozone. Many areas downwind of large cities have relatively high emissions of biogenic VOCs from trees and other vegetation. Reactions of transported anthropogenic NO_x with biogenic VOCs are able to produce ozone concentrations of 80 to 100 parts per billion or greater. Because ozone formation in rural areas is limited by the availability of NO_x, control of NO_x in upwind areas is an important strategy. (ARB, Rethinking the Ozone Problem in Urban and Regional Air Pollution, The California Perspective, 1993).

We included a discussion of negative reactivity in the Draft Program EIR (pages IV-79 through IV-80). The Draft Program EIR acknowledges that under some conditions VOCs will promote ozone formation, but also mentions that VOCs can act as NO_x sinks, thus limiting the amount of ozone formed. The NO_x concentrations typically found in California are high enough that VOC controls are an effective strategy throughout the State. Low 6 a.m. to 9 a.m. NO_x conditions, combined with high VOC/NO_x ratios that tend to suppress VOC reactivity, do not commonly occur in nonattainment urban areas. Most ozone non-attainment episodes, such as in the South Coast Air Basin, are characterized by high 6 a.m. to 9 a.m. concentrations of NO_x, and low VOC/NO_x ratios, conditions which are not conducive to negative reactivity.

Ordinary ambient air monitoring collects data on ozone and NO_x, which are criteria pollutants. In California, certain VOCs are measured by Photochemical Assessment Monitoring Stations (PAMS) monitors, in the summer months in serious, severe, and extreme federal ozone non-attainment areas. About 70 percent of the population of California resides in districts where PAMS data are available. Thus, PAMS data supporting the need for VOC reductions are available for many districts that have architectural coatings rules.

Although data are not available for all of California, we used the data provided by the PAMS to calculate the 6 a.m. to 9 a.m. non-methane organic compounds (NMOC)/NO_x ratios for several monitoring sites throughout California. Sites included urban and rural areas of the State. During the summers of 1996 and 1997, the average NMOC/NO_x ratio was below 15 for all sites studied. The percent of samples that had a NO_x concentration of 40 ppb or less, and a NMOC/NO_x ratio of 20 or greater are 0 to 4 percent at most sites. We found that atmospheric concentrations typical of California have NO_x levels which are greater and NMOC/NO_x ratios which are almost always lower than those that result in negative reactivities (Woodhouse, L., NO_x Concentrations and VOC/NO_x Ratios in California, Planning and Technical Support Division, California Air Resources Board, January 19, 1999).

According to the study presented to us by Dunn-Edwards (Letter and enclosures from Edward D. Edwards to ARB staff, August 19, 1998), the urban reactive organic gases mix which is used to represent ambient air in smog chamber experiments, had a negative reactivity at a NMOC/NO_x ratio of 20 or greater, and NO_x concentrations from 5 to 40 ppb. According to that study, VOC/NO_x ratios higher than 20 are needed for negative reactivity to occur. Our experience has shown that wherever vehicular emissions occur, VOC/NO_x ratios are low enough and the NO_x concentrations are high enough to promote ozone formation. Thus, the NO_x concentrations and NMOC/NO_x ratios used in the Dunn-Edwards study are not typical of the ambient conditions found in populated areas of California.

We know from our modeling experience that negative reactivity almost always occurs where there are very low ozone levels (because there is low NO_x). However, the proposed SCM is intended for ozone nonattainment areas where negative reactivity rarely occurs. We also know from modeling that peak ozone is always responsive to NO_x control, and we have never seen conditions where VOC control is counterproductive in ozone nonattainment areas.

15-40. Comment: The Draft EIR reasons that because mass-based VOC controls have been somewhat effective in the past, they are preferred for the SCM. The Draft EIR does not distinguish the effectiveness of mass-based architectural VOC control strategies from mass-based mobile source control strategies or other control strategies. This is crucial because different sources emit different VOCs which have different effects on ozone levels. Some VOCs can cause an order of magnitude more ozone than others, and some VOCs are negatively reactive. The mass-based regulation does not selectively remove VOCs, thus ARB does not know whether the SCM will make products more or less reactive. There is insufficient supporting discussion of the SCM's mass-based approach.

Response: Architectural coatings are area sources similar to consumer products. To distinguish the effectiveness of mass-based consumer products VOC control strategies from mass-based mobile source control strategies, modeling results were reported in an October 29, 1996, Consumer Products Working Group meeting.

In this case, the Urban Airshed Model was used to simulate the impacts of consumer product emissions on peak ozone and population exposure for the South Coast Air Basin. The simulations were for the South Coast Air Basin for August 26-27, 1987, and used emissions and meteorology from the 1994 SIP. These simulations showed that consumer product emissions are about 60 percent as effective in reducing peak ozone as motor vehicle emissions per ton of VOC emitted. Reductions of population exposure to ozone concentrations above 9 parts per hundred million (the State ozone standard) were the same for consumer products as for motor vehicles per ton of VOC emitted.

Mobile source controls are more effective in reducing maximum ozone in peak concentration areas because motor vehicle emissions are more reactive than area source emissions. However, area source controls (such as for consumer products and architectural coatings) are very effective in reducing population-weighted exposures to ozone. Thus, on a population-weighted basis, any decrease in mass VOC emissions from area sources is very effective in reducing ozone exposures.

The commenter is referred to the response to Comment #15-37 of the Final Program EIR for a discussion of the reactivity impacts of substitution.

15-41. Comment: A recently published article found that acetone is 25 times more hazardous than mineral spirits. The Draft EIR concludes that any increased use of acetone will generally be balanced by reduced usage of other equally or more hazardous materials such as MEK, toluene, xylenes, *etc*. Contrary to the Draft EIR’s characterization, however, if the SCM’s VOC content limits for major categories were implemented (without a viable averaging provision), acetone would serve as a replacement primarily for mineral spirits (paint thinner), not MEK, toluene, and xylenes. This replacement of mineral spirits with acetone would be widespread, and would result in considerably increased health and safety hazards.

Response: The evidence does not support the contention that increased fire and safety hazards will result from the SCM. The ARB acknowledges that the application of some paint formulations presents an inherent fire danger if accepted operating guidelines are not followed. If existing fire department codes are followed when working with flammable or combustible liquids it would be difficult if not impossible to achieve the vapor concentrations necessary to pose fire danger. In the 1998 ARB survey, which reports 1996 sales data, acetone was reported as less than one percent of the speciated inventory. Although acetone has been exempted since June 1995, we have not received information that significant reformulation of architectural coatings with acetone will occur. Acetone use was reported in only eight coating categories, including lacquers and traffic paints, and industry agrees its use will be limited by its solvent characteristics. There are no additional Department of Transportation requirements for distribution or sale of acetone, although there are additional storage requirements because of the high flash point. All of the large coating manufacturers currently offer for sale acetone in quart or gallon containers recommended as special-purpose thinner, cleaner, and remover. In addition, containers for typical lacquer thinners manufactured by numerous manufacturers indicated the presence of acetone, ranging from 7 to 25 percent by volume.

These lacquer thinners are recommended and are used widely for reducing coatings, cleaning equipment, and cleaning paint spills. In setting the VOC limits in the SCM, the ARB did not rely exclusively on acetone as a reformulation option--it is only one of several compliance options.

15-42. Comment: Mass-based VOC regulations are inefficient for reducing VOC emissions because lower VOC paint may lead to increased paint use. The Draft EIR must determine not only the level of VOC emission reductions from a given volume of paint, but also the change in the amount of paint required to complete a given job due to changes in product performance (as indicated by reduced coverage, more coats, more thinning, more priming, more touch-ups, or more frequent recoating). Emissions potential should be measured as emissions per area covered divided by service life. The Draft EIR rejects a performance-based alternative because no consensus could be reached regarding measurement of performance standards. In fact, consensus was not reached on any of the SCM's provisions. ARB staff did not attempt to generate consensus on a performance-based alternative, but instead simply rejected this alternative. Without a performance-based alternative, the potential exists for more paint usage and thus adverse environmental impacts. The Draft EIR does not comply with CEQA.

Response: Performance-based standards are addressed on pages V-138 and V-139 of the Draft Program EIR. The Draft Program EIR addresses the change in the amount of paint required to complete a given job due to changes in product performance (*i.e.*, the "seven deadly sins") on pages IV-61 through IV-80. The commenter has presented no data that would suggest that without a performance-based alternative, more paint would be used, or that CEQA requirements have not been met. As discussed in the Draft Program EIR, performance-based standards would be burdensome, expensive, and unenforceable.

According to the July 1998 EL RAP concept paper, "Innovative Approaches to Regulating Architectural Coatings," the performance-based alternative assumes that performance is measured by coverage (which is not defined) and durability or service life (*i.e.*, the average interval between successive re-applications). Service life would be quantified by using a "standardized test protocol involving those qualities that most contribute to long-term durability (*i.e.*, adhesion, hardness, abrasion resistance, soil release and stain resistance, color retention, weatherability, moisture and chemical resistance, and corrosion resistance)." An analogy is drawn to fuel economy tests on vehicles.

The commenter's suggestion that "performance" be based on the "emissions potential" of "emissions per area covered divided by service life" oversimplifies the complexities of measuring all of the characteristics that would need to be measured. The proposal assumes that regulators and manufacturers could agree on what constitutes acceptable performance characteristics, as measured by agreed upon tests, for agreed upon testing duration. Durability is also influenced by the wide variety of substrates, under a wide range of environmental conditions, by an infinite number of users' application techniques and surface preparation. If performance-based standards replaced VOC limits for individual coating categories, each of the thousands of coatings on sale in California would have to be certified by the standardized test protocol, labeled specifically for California based on the standard test protocol results, and comply with recordkeeping and reporting requirements. Unlike vehicle fuel economy tests, which certify a relatively small number of vehicles, the testing protocol would have to be performed on thousands of coatings. These tests would be expensive and burdensome for manufacturers.

Contrary to the commenter's claim, we believe that consensus was reached on many of the SCM's provisions because of the public process and the individual meetings with manufacturers, in which specific issues and data were discussed. Several changes were made to our original proposal based on this input. We also disagree that ARB made no attempt to reach consensus on performance-based standards, as we did discuss this alternative as presented in the EL RAP paper at the August 1998 workshop. The result of the discussion was that performance-based standards were determined to be unenforceable, and would pose a severe administrative burden on manufacturers. Based on this discussion, and in the absence of a more concrete proposal, we did not pursue it further.

15-43. Comment: According to a paper by Harley, et al., mineral spirits represent approximately 80 percent of the volume of solvents used in solvent-based architectural coatings. In aggregate, MEK, toluene, and xylenes make up only five percent. For example, a typical solvent-based Primer, Sealer and Undercoater formulated with mineral spirits to meet the current limit of 350 g/l could be reformulated to meet the proposed limit of 200 g/l by replacing half the mineral spirits with acetone. This would greatly increase the product's potential health and safety impacts.

Response: The primary purpose of this paper is to address diesel emissions, not architectural coatings. According to our 1998 architectural coatings survey, petroleum distillates account for approximately 64 percent of the VOCs in solvent-based coatings. The commenter is referred to the response to Comments #15-36 and #15-37.

We believe that acetone will displace some mineral spirits as well as other solvents. However, we do not believe that acetone usage will be widespread. We expect it to be used in a limited number of categories (*e.g.,* lacquer). The potential health and safety impacts of using acetone will be less than those impacts associated with the current products. Due to increases in the proposed limits for floor coatings and waterproofing sealers, we do not believe acetone will be used in these categories.

15-44. Comment: The Draft EIR rejects a seasonal approach for several reasons. First, the Draft EIR suggests that manufacturers may have difficulty managing their inventory to comply. Of course, if this were a real issue manufacturers could avoid the problem by producing compliant coatings year round. Second, the Draft EIR offers no explanation about why labeling will not solve the problem of informing individual painters as to when it is "legal" to use a can of paint. After all, it is assumed that painters will follow other aspects of the label directions, such as directions on thinning. Third, the Draft EIR does not discuss possible enforcement mechanisms or quantify the costs or "difficulty" associated with seasonal regulation.

Response: On the commenter's first point, the ARB staff believes that managing inventory is in fact a real issue. A seasonal regulation alternative would not simply involve inventory management by manufacturers. Distributors and retailers would also be involved, because they would have to manage inventories of many thousands of individual cans of paint, at thousands of distribution centers and retail locations. Some of these cans would be legal to sell only at certain times of the year, and everyone in the system would have to make sure that all the "illegal" cans of paint were taken off the shelf and not sold during certain times of the year. The potential for mistakes is obviously fairly high. It is true that manufacturers could avoid this problem by producing compliant coatings year-round; this is exactly what the SCM requires as it is presently written, without the seasonal regulation alternative.

On the commenter's second point, the Draft Program EIR points out a number of practical reasons why it is not realistic to expect thousands of individual painters to both know the rules and follow them. Common sense indicates that labeling would not solve this problem. Many people either will not read the label, or will not follow a labeling restriction that relates solely to air quality considerations, and not considerations about how the paint will perform to do the job at hand. It is far more likely that painters will read and follow thinning directions. Thinning involves actually changing the contents of a can of paint, as opposed to simply opening a can and using the paint. When someone is taking the trouble to add water, lacquer thinner, mineral spirits, or some other substance to a can of paint, they are more likely to check the label and make sure that: (1) they are adding the right type of thinner, and (2) they aren't adding so much thinner that the performance of the paint will be compromised. Such common sense observations about thinning are based on empirical studies and other considerations, as discussed in Chapter IV of the Draft Program EIR and the response to Comment #15-28 of the Final Program EIR.

Regarding the commenter's third and final point, the enforcement mechanisms for a seasonal regulation approach are fairly obvious: each air district could hire more air quality inspectors (or redirect existing district inspectors to architectural coatings duty, instead of enforcing other district rules), and send them out to inspect hundreds of retail paint stores, as well as thousands of job sites where painting is occurring. That such an enforcement approach would be both expensive and very difficult is also obvious. To reach this conclusion, quantifying the costs of the approach is not really necessary.

15-45. Comment: The Draft EIR rejects a regional regulation alternative because of the difficulty of enforcement and modeling regional effects of the SCM, yet it projects statewide environmental impacts. The SCM should be postponed until gaps regarding regional effects are filled by data from the new air chamber at the University of California at Riverside.

Response: There is no good reason for postponing the adoption of the SCM. Research on air quality is being conducted on an ongoing basis, and it is almost always true that we will know more in the future than we know now. But extensive research on air quality has already been done over the last three decades, and the ARB staff is confident that there currently exists more than enough data to conclude that VOC reductions from the SCM will improve air quality in California (see the response to Comment #15-39 of the Final Program EIR). It is not necessary to wait for more research before proceeding.

Regarding the alternative of regional regulation, the commenter has incorrectly interpreted the discussion in the Draft Program EIR. The Draft Program EIR does not reject the regional regulation alternative because "… it is too difficult to predict the effects of regulation in various regions of the state …". Rather, this alternative was rejected because: (1) it is virtually impossible to enforce, (2) it could have an adverse effect on PM_{10} levels, and (3) it is not possible to accurately determine whether allowing an exemption from VOC regulations in particular geographical areas could be done without harming air quality. The commenter misinterprets this last point (*i.e.*, that we do not know enough to be confident that an exemption from VOC regulation can be safely undertaken in certain areas), and erroneously concludes that, therefore, we must not know enough to determine whether VOC reductions in general will actually benefit air quality statewide. Based on years of research, however, the ARB staff does have sufficient knowledge to answer this question. For more a more detailed discussion of these issues, please see the responses to Comments #15-2 and #15-24.

15-46. Comment: The Draft EIR rejects the exceedance fee option from the National Rule because the fees are too low, but does not explain why a higher fee could not be instituted. The lack of this provision precludes manufacture of high quality, high VOC coatings, and results in use of less durable coatings and use of more paint.

Response: The Draft Program EIR lists several reasons for rejecting the exceedance fee approach, and not does not base this rejection solely on the low amount of the fee. Regarding the amount of the fee, however, the ARB staff agrees that it would be possible to implement a higher fee than the amount specified in the National Rule. In theory, the higher the fee, the less coating manufacturers would take advantage of this option, and the less adverse emissions impact the fee would have. But there are problems with simply raising the fee. First, no one has any idea at what level to set the fee, because there is no historical experience to indicate how much of an emissions impact would result from different fee levels. More fundamentally, the ARB staff simply does not see a convincing rationale for implementing an exceedance fee approach. California needs the emission reductions from the SCM, and fewer emission reductions will result if some manufacturers simply pay the fee instead of reformulating some of their coatings. Since the ARB staff has also concluded hat the VOC limits in the SCM are feasible (as discussed at length throughout the Draft Program EIR), staff does not accept the commenter's argument that there is some technical need for exceedance fees to remedy performance problems in coatings.

15-47. Comment: The LVP exemption in the EPA and ARB consumer products regulations set the legal and technical precedent for an LVP exemption for other regulations, including the SCM. The reasons the Draft EIR rejects the LVP-VOC alternative are technically unclear. The SCM's purpose is to bring consistency to architectural coatings regulations, and the lack of an LVP exemption in current district rules is not a reason not to consider it in the SCM. The real issue is equity with other similarly situated parties. Many consumer products (*e.g.*, floor polishes, adhesives, caulking compounds, and fabric protectants) are coating-like, being applied to a surface and harden or cure by drying after application. Both architectural coatings and consumer products have low to high volatility compounds, with low volatility compounds making up a small fraction of total VOC contents. LVP-VOCs are used in architectural coatings as co-solvents in water-based coatings, which regulators favor because of their lower VOC content. Exemption of LVP-VOC will enhance formulation flexibility for water-based coatings, and minimize regulatory impacts for industry and consumers.

Response: We disagree that the LVP-VOC exemptions given for consumer products set the precedent for a similar exemption in architectural coatings. There is no precedent for an LVP-VOC exemption in any other architectural coating rule at the national, state, or local level. There is also no precedent in aerosol coatings, adhesives and sealants (which are regulated by districts), or aerosol adhesives, nor is there a precedent among district coating rules of any type (*e.g.*, wood, metal, plastic, marine).

We also disagree that architectural coatings and consumer products are similar enough to justify an exemption based on equity. While a few categories of consumer products such as floor waxes and caulking compounds are applied to last a long time, most categories of consumer products and architectural coatings are very dissimilar in their usage mechanisms and durability requirements. The largest categories of consumer products, personal care products such as hair sprays, are not exposed to the same long-term exposure to environmental conditions as architectural coatings. Also, the emissions from the use of LVP-VOC hydrocarbon distillates are included in the consumer products emission inventory.

We also disagree that low volatility compounds make up a very small portion of the architectural coatings inventory. As mentioned in the Draft Program EIR, the commenter claims that an LVP-VOC exemption would reduce the emissions inventory for architectural coatings by 30 percent. This cannot be construed as a “small” portion of the inventory. We believe that if an LVP-VOC exemption were granted, the 30 percent figure cited by the commenter would grow even larger, resulting in substantially less emission reductions from the SCM.

15-48. Comment: U.S. EPA Test Method 24 conditions (110^{o}C for one hour) do not represent normal application conditions of architectural coatings. The U.S. EPA does not believe an LVP exemption would be appropriate for low volatility compounds because under “certain processes” these compounds would volatilize; the commenter suggests that “certain processes” would involve high temperatures and hot gas emissions, whereas architectural coatings are not heated during or after application. Method 24 uses temperatures of 230 ^{o}F for 1 hour, which would drive off compounds that would not volatilize to the same extent or at all under normal application conditions. This is confirmed by the ARB’s indoor air quality study (Hodgson, 1999) which demonstrated that only 10 to 30 percent of latex paints LVP-VOC co-solvents are emitted two weeks following application to interior drywall. The study states that it is unknown if all the co-solvents are re-emitted. The commenter states that even if the co-solvents were re-emitted at lower rates over longer time periods, most of the emissions would not occur when they could contribute to ozone formation, *i.e.*, during non-ozone season.

Response: U.S. EPA Method 24 was developed to simulate the VOC emissions over the lifetime of the coating in a reasonable amount of time, and is not meant to simulate the application conditions of coatings. During the lifetime of a coating, exposure, climate, and changing temperatures affect the VOC emissions. All test methods are designed to represent data under certain specific conditions, Method 24 being no exception. In this instance, these conditions serve as a way to compare each coating's emissions. The Censullo *et al.* (*Improvement of Speciation Profiles for Architectural and Industrial Maintenance Coating Operations*, Final Report for ARB Contract 93-319, June 30, 1996) study shows how low volatility compounds behave under Method 24 conditions. After drying a semigloss paint film containing a known amount of Texanol® for 100 minutes at 110^{o}C, 8.3 percent of the Texanol® that was in the original coating was left in the film. Thus, if a manufacturer used the Method 24 results to label the amount of VOC in this coating, this small amount of Texanol® would not have to be declared as a VOC. We believe that Method 24, as the approved method by the U.S. EPA and districts, does represent real-world conditions over the period of years that many coatings are in service.

The U.S. EPA (Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations, Clarification to Appendix D of November 24, 1987 *Federal Register*, May 25, 1988) has said that low volatility compounds, under "certain processes," would volatilize and participate in photochemical reactions. The volatility of VOCs is affected by temperature, high air exchange, temporary absorption onto substrates, removal mechanisms such as aerosol formation, and the nature of the matrix in which they are dissolved (Kurland, *et al*., Volatility and Fate, June 6, 1999, http://narsto.owt.com/Narsto/reactinfo.html). Other influences on volatility of VOCs coatings are the thickness of the paint film and the substrate. The references cited in Chapter V of the Draft Program EIR provide more detail on the fate of low volatility compounds in coatings.

The commenter's statements about the Hodgson (*Common Indoor Sources of Volatile Organic Compounds: Emission Rates and Techniques for Reducing Consumer Exposures*, ARB Contract No. 95-302, January 1999) study are partially true. After two weeks, 19 to 35 percent of the Texanol® and four to 14 percent of the LVP solvents were emitted, depending on the ventilation rate. However, the study also states that after three months, less than 20 percent of the applied ethylene glycol and less than 50 percent of the applied Texanol® would be expected to be emitted. The study concludes that if 100 percent of the ethylene glycol and Texanol® applied to gypsum board were re-emittable, it would take more than one year for them to be completely released to the air. Since this process is continuous, it is not true that most of the emissions would be given off during the non-ozone season. Chang, *et al.* (Evaluation of Sink Effects on VOCs from a Latex Paint, *Journal of the Air and Waste Management Association* 48:953-958, 1998) estimated that it would take as long as 3½ years for all of the ethylene glycol to be re-emitted from gypsum board. Futhermore, Chang, *et al.* (Substrate Effects on VOC Emission from a Latex Paint, *Indoor Air* 7:241-247, 1997) demonstrated that when the substrate was metal, 89 to 100 percent of the LVP-VOCs were emitted within two weeks. The point is that no study we know of actually was conducted long enough to conclusively answer the question of whether the LVP-VOCs are completely re-emitted from wallboard, but a large percentage has been shown to emit over a period of a few months.

15-49. Comment: Failure to grant an LVP-VOC exemption is counterproductive to optimizing performance of water-based coatings, thus adding to total ecological burdens of paint production, distribution, and use. This would impact air and water quality, material and energy resource consumption, health and safety, and solid waste disposal.

Response: The commenter provides no basis for why failure to grant an LVP-VOC exemption would result in ecological burdens from paint production, distribution, and use, as well as air and water quality impacts, material and energy resource consumption, health, safety, and solid waste disposal. We disagree that failure to grant an LVP-VOC exemption is counterproductive to optimizing performance of water-based coatings. As has been stated at workshops and in written comments, solvents are not used frivolously in coatings—they are used for a specific purpose. The lack of an LVP-VOC exemption does not materially affect manufacturers' choices for the performance characteristics desired because they already use these compounds for their functionality. An LVP-VOC exemption would be more detrimental to the environment because there would be a tendency to find new uses for the exempt VOCs, thus adding to the emissions of these compounds. We have analyzed all of the impacts of the SCM mentioned in Chapter IV of the Draft Program EIR, and have found them to be insignificant.

15-50. Comment: Dunn-Edwards supports the ARB's commitment of studying reactivity issues and pursuing a possible reactivity-based rule, but disagrees with the Draft EIR's conclusion that such a rule is not currently feasible. The commenter quotes a 1995 article in *Science* magazine (Russell, *et al.*, Urban Ozone Control and Atmospheric Reactivity of Organic Gases, *Science* 269:491-495, July 28, 1995) that concluded that reactivity-based architectural coatings regulations were feasible *at that time*. ARB's experience with reactivity-based regulations should make it easier to implement for architectural coatings. The Draft EIR contends that VOC inventory and reactivity data are needed, while the Science article concludes that sufficient information already exists. Any gaps in reactivity data and coatings' VOC inventories could be temporarily filled using reasonable assumptions or can be quickly generated.

Response: The Russell, *et al.* article quoted does not conclude "that reactivity-based architectural coatings regulations were feasible *at that time*," as the commenter claims. It says that reactivity-based regulations are currently used for automobile emission regulations in California, and that because of the potential of adopting similar vehicular regulations elsewhere in the U.S., there is a need to understand the science, benefits, issues, and research needs associated with reactivity weighting. (Reactivity weighting is the relative reactivity method used in ARB's Zero Emission Vehicle/Clean Fuels regulation where the reactivity factor used in the regulation is the ratio of the reactivity of the alternative fuel to that of standard gasoline.)

As we said on pages V-153 to V-154 in the Draft Program EIR, The ARB is not opposed to considering reactivity-based standards for architectural coatings at some point, but we first need better survey data. In the ARB's reactivity-based regulation for aerosol coatings, which will be considered by the Board in June 2000, survey reporting requirements include a product-by-product complete speciation of all VOCs (including exempt compounds), to the nearest 0.1 percent composition of the product. This level of information is considerably more detailed than the architectural coatings industry has so far agreed to provide. Without this level of detail, the emission impacts of the regulation cannot be fully assessed. It would not be good science to make assumptions on reactivity of some compounds for which we do not have peer reviewed reactivity data, especially in view of the lack of detailed speciation on architectural coatings. The aerosol coatings reactivity-based standards will be the first regulation based on MIRs instead of relative reactivity factors based on MIRs. We think that first implementing the aerosol coatings regulation and evaluating the results, before proposing a similar program for architectural coatings, is a prudent approach. The extra time can be used to conduct a more detailed architectural coatings survey.

15-51. Comment: The commenter urges ARB to reconsider its apparent decision to use the Maximum Incremental Reactivity (MIR) scale for characterizing the reactivity of VOCs. This scale is valid only for an extremely narrow range of environmental conditions most often found in the laboratory, or occasionally in a few heavily populated urban cores. Under the ambient conditions that predominate in California, *i.e.*, low NO_x or high VOC/NO_x ratio, the MIR scale will misrepresent real-world conditions and in regulations might be counterproductive. VOC reductions under these conditions can promote rather than inhibit ozone formation due to environmentally-dependent negative incremental reactivity of most VOC solvents, including mineral spirits.

Response: Low NO_x and high VOC/NO_x ratios are predominant only in remote, mountainous, sparsely populated California areas. The MIR scale is more appropriate when applied to a wide variety of conditions including investigating population exposure to integrated ozone or ozone over the air quality standard (Carter, Development of Ozone Reactivity Scales for Volatile Organic Compounds, *Journal of the Air and Waste Management Association* 44:881, 1994). Comparison of the MIR scale with the results of three-dimensional gridded models (which include transport and different environmental conditions) shows that the MIR scale correlated well with population-weighted exposure (McNair *et al.*, Airshed Calculation of the Sensitivity of Pollutant Formation to Organic Compound Classes and Oxygenates Associated with Alternative Fuels, *Journal of the Air and Waste Management Association* 42:1740178, 1992; McNair, *et al.*, Airshed Model Evaluation of Reactivity Adjustment Factors with the Maximum Incremental Reactivity Scale for Transitional-Low Emission Vehicles, *Journal of the Air and Waste Management Association* 44:900-907, 1994; Bergin *et al.*, Quantification of Individual VOC Reactivity Using a Three-Dimensional Photochemical Model, *Environmental Science and Technology* 29:3029-3037, 1995; Bergin, *et al.*, Effects of Chemical Mechanism Uncertainties on the Reactivity Quantification of Volatile Organic Compounds Using a Three-Dimensional Air Quality Model, *Environmental Science & Technology* 32:694-703, 1998; Kaduwela *et al.*, Photochemical Reactivity of Organic Compounds in Central California: A Grid-Based Modeling Study, *Seventh International Conference in Air Pollution, Advances in Air Pollution Series*, Volume 6, Brebbia, *et al*, eds, WIT Press, Southampton, pages 893-902, 1999).

15-52. Comment: The analysis of impacts and air quality benefits associated with each alternative is technically inaccurate and misleading to decision makers. Table II-1 summarizes CARB survey data which indicates that emissions from architectural coatings have decreased nine tons per day between 1990 - 1996 or 1.25 percent annually in the absence of regulation. Therefore, Table V-3 inaccurately characterizes the No Project Alternative as having no emission reduction potential. This is untrue both because market forces are reducing VOC content in coatings regardless of regulation, and because the National Rule is effective in one-half [*sic*] of all California air districts. Allowing consumer demand for water-based products to continue to drive the market could result in more emission reductions than those expected to be achieved through implementation of the SCM.

Response: As explained in the response to Comment #15-10(b) of the Final Program EIR, the commenter's implication that emissions declined during a period that was absent further regulation is unfounded. California's 17 districts with architectural coating rules in place comprise 96 percent of the State's entire population. The emissions benefit that could result from the National Rule in the remaining 18 districts, which only comprise four percent of the State's population, is negligible. The remaining argument regarding emissions and predicted decline (absent any further regulation) is predicated on an assumption that cannot be proven or guaranteed.

15-53. Comment: The Draft EIR rejects product-line averaging as an alternative to the SCM at this time, despite recognizing that it is a feasible alternative which would "improve cost-effectiveness of the rule" (EIR at V-138 to V-139). Product line averaging is viable and necessary to achieve any emission reductions at all from this proposed rulemaking because, without product-line averaging, the proposed emission limits are technologically infeasible.

Response: Although the proposed SCM does not currently include an averaging provision, we are currently working with interested parties to develop such a provision to be presented at the June 22, 2000, Board meeting. Please see the response to Comment #1-2 of the Final Program EIR. ARB staff has concluded that each of the VOC limits in the SCM is independently feasible, and averaging is not necessary to make the SCM feasible. Chapter VI of the Staff Report contains the analysis supporting the conclusion (see also Appendix E of the Final Program EIR).

15-54. Comment: The Draft EIR declares that "the existence or absence of averaging does not affect either the ARB's analysis of the technical feasibility of VOC limits in the SCM, or the ARB's environmental analysis for the SCM." Dunn-Edwards strongly disagrees.

The SCM's proposed VOC limits are based on the SCAQMD's May 1999 amendments to Rule 1113. Unlike the SCM, however, Rule 1113 includes an averaging provision. Without a viable averaging provision like that contained in SCAQMD Rule 1113 many of the VOC content limits in the proposed SCM are beyond the scope of technological and economic feasibility and result in adverse environmental effects. Available studies do not support the assumption that the SCM's VOC limits are achievable absent this averaging provision.

Response: Although the proposed SCM does not currently include an averaging provision, we are currently working with interested parties to develop such a provision to be presented at the June 22, 2000, Board meeting. Please see the response to Comments #1-2 and #15-33 of the Final Program EIR.

15-55. Comment: According to the Draft EIR, "ARB staff is not considering using SCAQMD Rule 1113 averaging approach in the proposed SCM." Although no averaging provision is including in the SCM currently, ARB staff is apparently considering an alternative averaging program that, in our opinion, would be excessively complex, burdensome, inefficient, and inequitable.

Response: Although the proposed SCM does not currently include an averaging provision, we are currently working with interested parties to develop such a provision to be presented at the June 22, 2000, Board meeting. The averaging provision would be similar to the SCAQMD averaging provision, with the addition of a sunset date. Please see the response to Comment #1-2 of the Final Program EIR.

15-56. Comment: Dunn-Edwards urges CARB staff to consider including a provision encouraging local districts to perform Technology Assessments to ensure high quality, durable coatings are available in the future.

Response: This comment is addressed in the response to Comment #4b-9 of the Final Program EIR. As explained in this response, ARB staff and SCAQMD staff will be conducting technology assessments. It is not necessary to include a provision specifying that each district should also conduct a separate assessment.

15-57. Comment: The Draft EIR is insufficient to inform the ARB and the public about the potential significant adverse environmental effects of the SCM. ARB should revise and re-submit the Draft EIR for further public comment before finalizing the proposed SCM. The revised Draft EIR should discuss further the effects of VOC reduction in different areas of California, the environmental effect of varying NO_x levels and NO_x transport across California, and possible effects on coating usage and VOC emissions from enforcement of the technologically infeasible VOC limits of the SCM.

Response: The commenter is referred to the responses to Comments #15-6, #15-19, #15-24, and #15-39 of the Final Program EIR. The ARB staff disagrees that the Draft Program EIR should be resubmitted for further comment before finalizing the proposed SCM. The commenter has submitted no compelling evidence that the ARB has inadequately analyzed the issues, and therefore no changes to the conclusions are warranted.

15-58. Comment: Dunn-Edwards appreciates ARB's efforts in evaluating innovative and meaningful approaches to dealing with ozone nonattainment, and looks forward to working with ARB on issues of mutual interest, as these are the keys to the viability of the industry and our mutual goal of clean air.

Response: The ARB staff appreciates the comment. We are willing to work with Dunn-Edwards and other members of the architectural coatings industry in developing creative ideas for our mutual benefit.

COMMENT LETTER #16
Multi-Agency (Metropolitan Water District of Southern California, California Department of Water Resources, California Department of Transportation)
April 7, 2000

16-1. Comment: The Metropolitan Water District of Southern California (MWD), the California Department of Water Resources (DWR), and the California Department of Transportation (Caltrans) support the efforts to reduce VOCs from architectural and industrial maintenance coatings. The extension of the proposed compliance date to January 1, 2004 for industrial maintenance coatings will be beneficial, although MWD, DWR, and Caltrans (the multi-agencies) view the basis for the extension differently than the ARB.

Response: The comment is noted.

16-2. Comment: The ARB has concluded in the DEIR that the proposed VOC limit of 250 g/l for industrial maintenance coatings is technologically and commercially feasible, and that low-VOC coatings perform as well as high-VOC coatings. Information from manufacturers' product data sheets were used. Based on MWD test experience, the multi-agencies continue to have concerns about the performance of low-VOC coatings. Historically, about 80 percent of the coatings tested do not meet MWD's performance standards. Approximately 75 percent of coatings do not meet the physical and performance claims in the manufacturers' product data sheets.

Response: As discussed in the Draft Program EIR and the Final Program EIR, we considered various information in developing the proposed VOC limits. In addition to product data sheets, we considered information from resin manufactures, independent testing, VOC limits from federal and district rules already in effect, industry/trade journals, and discussions and input from various affected groups including essential public service agencies.

16-3. Comment: Preliminary results from current testing show that many low-VOC coatings are failing. Out of 75 coating systems (primer coat with intermediate and/or topcoat) tested for high humidity exposure, 16 (21 percent) are performing satisfactorily, while 59 (79 percent) are showing moderate to severe premature degradation and deterioration, after 90 days of testing.

The multi-agencies continue to recommend that sufficient time be provided for testing. The proposed limit of 250 g/l to be effective January 1, 2004 is not in alignment with the South Coast Air Quality Management District's (SCAQMD) limit of 340 g/l effective until 2006, and 100 g/l thereafter, for essential public service agencies. However, the multi-agencies anticipate that substantial test results will be available by 2004, and that ARB staff should review the results. The multi-agencies recommend that the technology assessment being conducted by the essential public service agencies for the SCAQMD be formally recognized in the draft SCM (or associated Board Resolutions). The Board should consider the results and, if needed, reconsider the VOC limit and effective date.

Response: When the MWD finalizes any of the intermediate or completed test results, we will be available to review and discuss the results. We will conduct a technology assessment one year before the 250 g/l VOC limit goes into effect in 2004. It is our intent to recommend to our Board, at the June 22/23, 2000 meeting, to take action to formally recognize the multi-agency (essential public service agency) test program.

16-4. Comment: The DEIR stated that the time extension to January 1, 2004 was provided to allow time for essential public service agencies to complete administrative processes before low-VOC coatings can be used. Although this is the case for contract/bidding processes, the multi-agencies requested the time extension primarily because of concerns regarding coating performance and availability.

Response: We have revised the Final Program EIR and Staff Report to be consistent with the comment.

COMMENT LETTER #17
McKenna & Cuneo
April 7, 2000

17-1. Comment: The commenter represents RPM, Inc. and is addressing only non-technical aspects of the proposed SCM. The commenter endorses the technical comments of Rust-Oleum and NPCA and urges the ARB to revise the SCM according to their comments as well.

Response: The comment is noted.

17-2. Comment: The SCM impermissibly shifts the burden of compliance from California residents to out-of-state manufacturers because the applicability, definition, labeling and reporting sections of the rule compel manufacturers to create coatings specifically for California. The rule particularly economically impacts small and mid-size manufacturers of niche or specialty coatings who rely on California retailers and distributors. The SCM should apply only to in-state users and retailers to conform with the National Rule, and reporting requirements should apply to distributors and retailers.

Response: The SCM does not shift the burden of compliance to out-of-state manufacturers. The SCM (once adopted by a local air district) would apply uniformly to any person who sells, supplies, or offers for sale architectural coatings within the district, regardless of whether the person is an in-state or out-of-state manufacturer. This approach is a not new one; it is the same approach that has been used in local district architectural coatings rules for 20 years (as well as in district rules for many other source categories, and in ARB fuels and consumer products rules). In this respect, the SCM will not change the current situation that already exists in the local districts, and would not require companies to change their business practices.

The commenter suggests that the ARB "should return the focus of the rule to in-state users and retailers." The current focus of the SCM is on any person who performs certain acts within the district. The ARB believes that this uniform approach is fairer than singling out certain classes of persons for enforcement (*i.e.*, retailers and users) and ignoring other classes (*e.g.*, manufacturers and distributors). Regarding some of the other points made by the commenter, the ARB's reasons for not using the same approach as the National Architectural Coatings Rule are discussed in the response to Comment #17-8 of the Final Program EIR. The commenter asks that reporting requirements be imposed only on distributors and retailers, and not manufacturers. The ARB believes that reporting requirements are most appropriately placed on manufacturers because in general, they have the most complete knowledge of the volume of coatings sold in California, and the formulations of those coatings (*i.e.*, toxic reporting requirements). Additional discussion of the reporting requirements is contained in the response to Comment #17-11 of the Final Program EIR. The commenter's remaining issues regarding manufacturers are discussed in the responses to the following two comments.

17-3. <u>Comment</u>: The term "manufactured for use" in the SCM is too vague, in that it is unclear how it applies to manufacturers of products that are not intended solely for architectural use, and may be used legally under other coating rules in a district. In addition, it is unclear if a manufacturer will be liable if a product it manufacturers is sold by a third party located in California and used by a California consumer in a manner that violates the rule. We request clarification.

<u>Response</u>: Regarding the first issue raised by the commenter, the key issue is whether a coating meets the definition of an "architectural coating", as that term is defined in the "Definitions" section of the SCM. If a coating meets this definition, then it is subject to the SCM. This is true even if the coating also happens to be subject to some other district rule, in which case the requirements of both rules would apply (unless there was some provision to the contrary in the district rules). To give a hypothetical example, perhaps a manufacturer makes a coating which states on the label that it can be used both to paint houses (*i.e.*, an architectural use) and boats (*i.e.*, a non-architectural use). Such a coating would be subject to the SCM because it is manufactured for use as an architectural coating, and, since it is also represented that the coating can be used to paint boats, it may also be subject to the district's marine coatings rule. This is one of the reasons why the proposed limit for antifouling coatings is consistent with the district limit for marine coatings. Additional discussion of the "manufactured for use" issue is contained in the response to Comment #17-4 of the Final Program EIR. Regarding the second issue raised by the commenter, no liability would be imposed on a manufacturer solely because the end user of the coating applies the coating in a manner that violates the SCM.

17-4. <u>Comment</u>: The SCM is not likely to achieve the expected 11 tons per day VOC reduction because the ARB has failed to account for the shorter life cycle of the coatings mandated. At the March 16, 2000 workshop, several industry technical representatives testified that the VOC levels established under the SCM would result in inferior coatings that will require more frequent maintenance. ARB staff dismissed these comments out of hand, instead deferring to a SCAQMD representative's example of a railing that was painted with a compliant coating three years ago and allegedly is still serviceable, and submittals of "proprietary data" that ARB staff has received. At the very least, ARB should state on the record the data on which they are relying to prove that coatings meeting the SCM VOC levels will have the same life-cycle as present coatings.

<u>Response</u>: The commenter has not accurately characterized the process used by ARB staff to make technical determinations. Contrary to the commenter's assertion, ARB staff did not rely on proprietary data or anecdotal information in concluding that low VOC coatings will not result in more frequent recoating. As stated in the Draft Program EIR, ARB staff analyzed the results of the NTS paint study, information comparing the characteristics of water-based acrylic resins and solvent-based alkyd resins, and other factors (see Chapter IV, pages 70-72). The information relied on by ARB staff is contained in the record, as explained in the response to Comment #17-5 of the Final Program EIR.

17-5. Comment: ARB has based technical decisions on “confidential and/or proprietary” data that cannot be scrutinized by the regulated community, and has dismissed the testimony of industry on technical matters. The ARB appears to be relying on SCAQMD staff’s opinion on numerous policy issues, including deferring to SCAQMD to answer questions and contradict industry testimony at the March 16, 2000 workshop. Significant interagency communication on all points relevant to developing the SCM with other governmental agencies should be recorded in the administrative record. ARB staff has had extensive communication with SCAQMD staff and other governmental agencies, and was not interested in the testimony of manufacturers because ARB had already made up its mind based on private conversations. ARB should respond to issues raised by industry, especially on industrial maintenance VOC limits, with objective and well-reasoned explanations on the record. We request that each conversation between ARB and other governmental agency representatives be placed in the administrative record, including parties involved, subject covered, and information provided.

Response: We disagree with the commenter’s characterization that the ARB relied on “off the record” data and communications, and that the ARB staff was not interested in industry testimony during the March 16, 2000 workshop.

The ARB has made publicly available all relevant data that staff is relying on as support for the SCM. There has been an open and public process for more than two years, with eight public workshops. Our workshop announcements, SCM revisions, reports, surveys, workshop summaries, workshop slide presentations, and lists of workshop attendees have been placed on the ARB’s Internet site. We have written responses to all letters received within specified comment periods during the EIR process. All documents referenced in the Draft Program EIR are available for public viewing. In response to industry’s concerns, we have created subcategories with higher VOC limits for industrial maintenance coatings, and are proposing a later effective date for the proposed limit (January 1, 2004 instead of January 1, 2003). We have remained objective and open to new information throughout the process.

Various meetings and conference calls have been held with districts and representatives of the U.S. EPA throughout the past two years to gather their advice and suggestions. The issues discussed with district and U.S. EPA representatives were the same as those discussed with the industry.

The commenter requests that a summary of every conversation between ARB staff and any other governmental employee be placed in the record. This is not a realistic request, because it would be very burdensome to summarize every single conversation. ARB staff has many informal discussions with representatives from both industry and other government agencies. Such discussions help define the issues, and ultimately result in a better rule. But simply engaging in a discussion is not the same as relying on the discussion as support for the SCM. If ARB staff intends to rely on a particular discussion as support for some aspect of the SCM, the discussion is summarized and included in the record.

17-6. Comment: The cost analysis is over-simplified and does not consider the high business management costs this rule imposes on out-of-state manufacturers to comply with it. The cost analysis focuses only on the cost of "ingredients" and fails to consider or even to identify the significant on-going costs to manufacturers of implementing sales, distribution, and accounting systems needed to collect data to file reports and sell products in compliance with the proposed rule.

Response: We disagree. The economic impacts survey and the associated cost analysis takes into account all available data on non-recurring costs (*e.g.*, equipment purchases, R&D, packaging changes, *etc.*), recurring costs (raw material changes, on-going administrative and distribution costs, *etc.*), and other ancillary costs resulting directly from implementation of the SCM. As discussed in the responses below, the survey requests that respondents identify any ancillary costs, such as recordkeeping and reporting costs, or any other costs not otherwise identified in the survey form and attach specific information regarding such costs to the survey for ARB staff's consideration. We reiterated this need for comprehensive data at the March 2000 workshop. However, the cost analysis is dependent on the extent to which respondents provide specific information. If respondents do not provide such information, it would be inappropriate for the analysis to speculate on unreported costs without some other credible basis. Thus, if respondents choose not to provide survey responses or choose not to report some costs, the cost analysis will either reflect this or will rely on reasonable assumptions based on U.S. EPA, SCAQMD, or other credible documentation to estimate these ancillary costs.

17-7. Comment: Under the applicability section of the proposed SCM, the terms "for use" and "manufactured for use within the District" are undefined and may be misinterpreted. There is no recognized exemption for coatings that may have legitimate use under other district rules, but may exceed the VOC limits in some architectural applications. The terms "sells" and "offers for sale" are also unclear if a product intended for out of state ends up in California. The SCM should apply only to sales occurring only in California, or out-of-state retail sales directly to end users in California.

Response: The language referred to by the commenter is located in sections 1 and 3 of the SCM. Similar language is contained in district architectural coatings rules currently in effect throughout California, and has been part of these rules for many years. Similar language is also contained in ARB statewide consumer products regulations (see title 17, California Code of Regulations (CCR), sections 94500, 94502, 94507, 94509, 94520, and 94522). Through many years of enforcement experience in California, this language has proven to be workable and fair, and has not given rise to the type of problems suggested by the commenter.

The commenter asks a number of questions about how the SCM would be applied to various fact situations. Such questions can best be resolved on a case-by case basis, when all of the facts surrounding a particular situation are known. However, it is possible to state that the SCM (if adopted by a district) would not impose any restrictions on lawful transactions that occur in other states. Just because a high-VOC noncomplying product ends up in a store in California does not necessarily mean that the manufacturer of the product is liable. In general, the person who sold or supplied the product into the district would be liable for a violation. But an "upstream" manufacturer or distributor would not generally be liable if they in good faith sold a noncomplying product to a person in another state, without knowledge or intent that the product would ultimately be sold in California, and somehow the product ended up in California as a result of the subsequent actions of a third party. These general principles describe how both district rules and ARB consumer product regulations have been enforced in the past. However, the terms "general" or "generally" have been used as qualifiers in the above discussion, because in any individual situation, there may be particular facts that would alter the conclusions set forth above.

17-8. Comment: Some coating category definitions in the proposed SCM differ not only from the National Rule, but also SCAQMD Rule 1113. Thus there will be at least three versions of architectural coating categories in California (SCM, SCAQMD, and National Rule). There is no justification for this industry-fragmenting and costly approach to the SCM. The National Rule should be a model for the SCM, except where significant VOC reductions can be guaranteed with reasonable impact on the regulated community and California consumers.

Response: In developing the SCM, the National Rule definitions were used as a starting point. Where the ARB staff and districts believed changes were needed, we considered the definitions in SCAQMD Rule 1113 and other district rules to establish consistency with existing rules. The same process was used with language in other portions of the SCM. When districts adopt the SCM language, there will be more consistency than currently exists in district rules. Chapter VI of the Staff Report contains information on what National and SCAQMD categories the SCM categories fit into.

The National Rule's categories and definitions were meant to apply across the U.S., including many areas that are not currently covered by an architectural coating rule. The U.S. EPA recognized that it may be important for states to have separate rules, and has recognized that need especially for California where architectural coatings have been regulated for more than 20 years, and where VOC limits were already far lower than what would have been appropriate nationally. District rules generally cannot be relaxed to conform to the National Rule because they are a part of the California State Implementation Plan, and because districts need the emission reductions that result from the stricter limits.

17-9. Comment: Some, but not all, definitions include "be labeled as and formulated for" the "intended use." This language is unclear and ambiguous, especially in view of other labeling requirements in the SCM, and should be eliminated for the following reasons. (1) The "intent" of the manufacturer determines whether a coating is appropriate for a given use, thus disallowing end-user discretion for desired use. Manufacturers would have to know every district rule, every coating category, and indicate the uses on the label for every district in the state. Manufacturers do not and should not be required to produce coatings for only one purpose or use. (2) The term "label(ed)" is not defined, but apparently means "container label," whereas other state and federal laws define it as anything that travels through commerce with the product and not necessarily attached to the container. It would be difficult to indicate the "use" of products for every district on the label. (3) "Formulated for" could be interpreted to mandate a formulation for each district and labeling for each allowable use. Manufacturers market coatings for many purposes with similar performance characteristics. (4) Generic coatings that have uses under several rules could be subject to enforcement action because of the SCM's requirement to indicate use on the label.

Response: We disagree that the terms "labeled and formulated for" should be eliminated. The term "labeled" does not represent a labeling requirement. It simply expresses the common-sense idea that one should read the product label to determine what the product is designed to be used for, and what category the product falls within. It is not necessary for a manufacturer to list every use that the coating might conceivably be used for. "Formulated for" means simply that the manufacturer provide a general indication of what the product is used for (*e.g.*, interior/exterior stain, exterior semi-gloss, floor coating), not that the manufacturer needs to formulate products specifically for each district.

17-10. Comment: The SCM is not clear whether "labeled as" in the definitions section is satisfied by the information required in the labeling section for specified coatings.

Response: The labeling requirements in the SCM are contained in Section 4. As mentioned in the response to Comment #17-10 of the Final Program EIR, there are no specific labeling requirements imposed by the "Definitions" section of the SCM (Section 1). Most of the definitions for specific coating categories in Section 1 simply set out criteria that a coating must meet in order to fall within the definition.

17-11. Comment: It will be difficult or impossible for out-of-state manufacturers to comply with the reporting requirements because it is unclear what is meant by "California sales." Reporting should be the responsibility of distributors and retailers.

Response: Manufacturers responding to the 1998 architectural coatings survey provided either California specific sales data, or they estimated sales based on apportioned national or regional sales figures. U.S. Bureau of Census population estimates were provided with the survey to assist manufacturers in estimating the California portion of sales. We expect that most manufacturers will use these population-based methods to comply with the Section 6 reporting requirements. It makes sense that manufacturers should be responsible for the reporting of sales information because the architectural coatings emission inventory is based on both VOC content and sales.

17-12. Comment: ARB should work with industry to establish workable enforcement provisions.

Response: The ARB staff has been working with industry all through the development of the SCM to develop enforceable provisions. For example, the labeling and reporting requirements for the new clear brushing lacquers category were developed to discourage manufacturers from re-labeling existing lacquers to be subject to the higher VOC limit for brushing lacquers. Also, where possible overlaps in categories exist, *i.e.*, quick dry enamels and high gloss nonflats, both categories have the same proposed limit. The ARB has been very responsive to industry suggestions regarding possible problems with rule language relating to clarity and enforcement.

17-13. Comment: At the end of the workshop, ARB made a presentation concerning the method that it will use to perform the economic analysis of the rule. ARB admits that the system they are using emphasizes the increased cost of the raw material needed to make the paint, and minimizes the so-called one-time cost to reformulate, retool and relabel. ARB plans to get the information it needs to perform this analysis by sending industry a questionnaire. Based upon the presentation at the workshop and a quick review of the form, it appears that ARB will be missing a number of significant factors that will yield large cost impacts. For example, the cost of collecting data on California sales may require companies to establish new and perhaps unique record keeping and monitoring systems, if the data are to have any relevance at all. The cost of labeling and ensuring that only the appropriate coatings are sold in each district in the State is also likely to require additional manpower, and administrative systems.

Response: The commenter is incorrect in his assessment of the economic impacts analysis. First, ARB staff did not state that the analysis approach emphasizes the increased cost of the raw materials needed to make compliant products. At the workshop, staff discussed earlier cost analyses conducted for the statewide consumer product VOC regulations to illustrate that, at least for those products, the change in raw material costs tended to dominate the overall cost impacts. However, ARB staff did not suggest that the cost analysis for the SCM would emphasize raw material costs. In fact, much of the workshop presentation focused on the need to get data on non-recurring costs (*e.g.*, equipment purchases, R&D, packaging and labeling changes), as well as recurring cost data (raw material changes, on-going administrative costs, distributional costs, *etc.*). With regard to the second issue, we agree that, in some cases, on-going administrative costs can be significant, which is why we emphasized the need to obtain such data at the March 2000 workshop and in the economic impacts survey. (See the response to Comment #17-14 in the Final Program EIR for additional discussion on the survey's request for information)

17-14. Comment: RPM did not return the questionnaire, because we do not yet have adequate information on what it will cost to reformulate our coatings, and because the questionnaire did not ask for the on-going administrative cost of selling products in California and reporting to the ARB.

Response: The comment is noted.

COMMENT LETTER #18
Wm. Zinsser & Co.
April 7, 2000

18-1. Comment: The commenter, a manufacturer of specialty primers, mentions that proposed 2003 changes to the SCM, with a few changes, can be implemented without drastically negatively affecting the coatings industry and the commenter's business.

Response: The ARB staff agrees that the proposed SCM provides feasible VOC limits and timeframes for the architectural coatings industry.

18-2. Comment: The classification for Quick-dry primer, sealer, undercoater should be consolidated into the specialty primer category. The need for quickness of dry time should not be separated from other performance properties required of a primer, sealer, undercoater product. For example, the speed of dry is part of the reason that some alkyd primers are effective in blocking stains. We recommend that the more specific title of specialty primer be adopted over the more general title of quick-dry primer, sealer, and undercoater.

Response: As noted in the Draft Program EIR, a study conducted by Harlan and Associates for the ARB in 1995 analyzed a large number of coatings listed as quick-dry primers, sealers, and undercoaters and concluded that most of the coatings listed as 'quick-dry' did not meet the definitional requirements, and thus should not be classified as such. In addition, the study concluded that some of the water-based technology included in the testing actually met the requirements of a quick-dry coating, but were not necessarily listed as a quick-dry coating.

Accordingly, it is the intent of the proposed SCM to essentially eliminate the quick-dry primer, sealer, undercoater category. This is why the proposed VOC limit for quick-dry primers, sealers, and undercoaters is the same as that for primers, sealers, and undercoaters (200 g/l). This is also consistent with the intent of SCAQMD Rule 1113. However, we keep the category in Table 1 to provide a link from current local air district architectural coatings rules, which have the category, to future rule revisions. We suggest that when districts next amend their architectural coatings rules after January 1, 2003, they remove the quick-dry primer, sealer, undercoater category from their definitions and tables of standards. (This is similar to our suggestions for quick-dry enamel and nonflat high gloss, as well as swimming pool repair and swimming pool coatings.) Thus, current 350 g/l quick dry primer, sealer, and undercoaters that meet the specialty primer definition can still exist under the specialty primer category, without the speed of dry restrictions.

18-3. Comment: The definition of specialty primer should be expanded to include additional common problematic conditions requiring a specialty primer:

A quick-dry primer that: seals stains- *e.g.*, fire water, graffiti; tannin, nicotine; AND seals odors- *e.g.*, fire, nicotine, urine*; AND bonds to glossy surfaces (without abrading surface)- *e.g.*, glass, ceramic, laminates; AND adheres to chalky painted surfaces. The coating must dry to touch in ½ hour and can be recoatable in 2 hours when tested in accordance with ASTM D1640 – 98.

Response: The suggested specialty primer definition differs from the proposed definition in that it:

- Necessitates that a specialty primer also be quick-dry product;
- Includes examples of the types of stains that are sealed;
- Necessitates that specialty primers seal odors, and cites examples*;
- Necessitates that specialty primers bond to glossy surfaces, and cites examples;
- Necessitates that specialty primers adhere to chalky painted surfaces;
- Eliminates reference to degree of chalking and to ASTM D 4214-98, which is a standard test method for evaluating the degree of chalking of exterior paint films.

The overall impact of the definition proposed by the commenter would be to create an extremely restrictive product category for specialty primers. The proposed SCM definition allows for products that are formulated to seal fire, *or* smoke, *or* water damage, *or* to condition excessively chalky surfaces, *or* to block stains. A product labeled and formulated for any one of these substrate conditions would be considered a specialty primer under the proposed definition.

The definition put forth by the commenter would necessitate that in order to be considered a specialty primer, a product would need to do all of the following: seal stains, seal odors*, bond to glossy surfaces, and adhere to chalky painted surfaces. In addition, products would need to be quick-drying in accordance with ASTM D1640-98. Our intent is to create a product category that recognizes the need for products that address issues particular to certain problem substrates, not to create a product category that would allow for only those products that were suitable for application in every situation.

Please see the response to Comment #18-2 of the Final Program EIR for our rationale behind aligning the proposed standards for quick-dry primers, sealers, and undercoaters with that of primer, sealer, undercoater products.

Inclusion of examples of the types of stains that may necessitate the use of specialty primers could create difficulty with definition interpretation. Citing examples may create the impression that these are the only types of stains to which a specialty primer may be applied, and we have therefore not included examples in our definition.

Initial review of product data sheets indicated no specialty primers that made reference to use as an odor blocker, so inclusion of this characteristic in the definition of the product category was not deemed necessary*. Review of additional product data sheets indicates there are products marketed for use as an interior vapor barrier. However, these products would already be considered either a specialty because they are also marketed as stain blockers, or a shellac. As indicated in the footnote, the request that the specialty primer definition include odor blocking has been withdrawn.

The specialty primer definition does not include those products intended for use on glossy surfaces, as there are primer, sealer, undercoater products available for these substrates. Among those products complying with the proposed limit for primer, sealer, undercoater and marketed as suitable for use on glossy surfaces are: PrepRite® Anchor-Bond Interior/Exterior Adhesion Promoting Primer (Sherwin-Williams Company), Bulls Eye 1-2-3 Primer Sealer (Wm. Zinsser Co., Inc), and Z-Prime II (Zehrung Corporation). Please note that the last two products are marketed as a specialty primer but meet the proposed limit for primers, sealers, and undercoaters).

The definition put forth by the commenter deletes any reference to degree of chalking of the substrate, and eliminates reference to the standard test method for evaluating degree of chalking. The proposed SCM definition includes reference to the degree of chalking because only those substrates that exhibit *excessive* chalking necessitate the use of a specialty primer. Reference to ASTM D-4214 is included as a standardized method to quantifying excessive chalking.

* Additional communication from Wm. Zinsser & Co. dated 4-19-2000 indicates that review of their original comments dated 4-7-2000 revealed they inadvertently included a recommendation that specialty primers block odors. The intent of the Wm. Zinsser & Co., per their correspondence dated 4-19-2000, was to not include the characteristic of odor blocking in their final recommendation for a specialty primer definition.

18-4. Comment: The 350 g/l VOC limit for specialty primers (which should incorporate quick-dry primers, sealers, and undercoaters) should be maintained beyond 1/1/2003. A VOC content limit of 200 g/l for quick-dry primers, sealers, and undercoaters would eliminate solvent-based coatings in this category. The majority of the quick-dry primer, sealer, undercoater coatings are near the current Federal limit of 450 g/l.

Response: In order to attain State and Federal ozone standards we must pursue emission reductions from all sources, including architectural coatings. We may need to obtain further emission reductions from architectural coatings, including specialty primers, through the development of future SCM revisions. Accordingly, we cannot commit at this time to freeze the specialty primer limit at 350 g/l.

Please refer to the response to Comment #18-2 of the Final Program EIR for the rationale behind aligning the proposed VOC limit for quick-dry primers, sealers, and undercoaters with the proposed limit for primers, sealers, and undercoaters.

COMMENT LETTER #19
Smiland Paint (JHL)
April 11, 2000

At the March 16, 2000 workshop, the ARB staff distributed the document entitled “Preliminary Complying and Noncomplying Formulations for the Cost Impacts Analysis.” The document contained “typical” (generic) coating formulations to be used solely for the purpose of estimating material costs in the ARB’s cost analysis. In response to a request by the ARB staff for comments from industry, the following comments on the formulations are provided.

19-1. Comment: Regarding floor coatings, would expect typical problems associated with two-component coatings. Also, expect poorer performance on exterior performance than with alkyds.

Response: It is unclear what is meant by “typical problems.” There are many two-component coatings, both epoxy and urethane, that claim excellent performance on exterior exposure. The increased recommended limit of 250 g/l also greatly increases the number and type of products available for use in this category.

19-2. Comment: Regarding industrial maintenance, would expect two-component coating to have poor gloss retention. The solvent-based noncomplying formulation would be expected to have poorer acid resistance.

Response: We concur. The “typical” complying formulation that was referred to is based on an epoxy resin. Epoxy coatings have the characteristic of “chalking” with exterior exposure (degradation of the resin on the coating surface due to sunlight), so that gloss retention is poor. That is why epoxy coatings are generally not used for exterior topcoats. However, epoxy coatings also have the characteristics of excellent adhesion and excellent chemical resistance. That is why epoxy coatings are used for primer coats (interior and exterior) and for chemical resistance in industrial floor coatings and tank linings. For topcoats, there are two-component polyurethane coatings and single-component acrylic coatings available for exterior use. These coatings have much better gloss retention characteristics.

The “typical” noncomplying formulation that was referred to is based on an alkyd resin. Compared with an epoxy coating, an alkyd coating would be expected to have better gloss retention and poorer chemical resistance, as noted. A general discussion on coating formulations and coating characteristics was included in the Draft Program EIR, Appendix D, Section A-12, pp 53-54.

Because of the broad range of industrial maintenance coating uses and the variety of resin types and formulations available, any single “typical” formulation would be expected to have some better characteristics and some poorer characteristics, compared with other types of formulations.

19-3. Comment: The commenter states that complying non-flat formulation would be expected to show poor open time. Also, the complying formulation for quick dry enamels probably would not comply with current quick-dry specifications.

Response: The draft formulations for the non-flat coatings and the quick-dry enamel coatings were derived from a number of actual products on the market made by different manufacturers. We assume that the actual products that are the basis of the draft formulations have acceptable open times (for non-flat coatings) and comply with the quick-dry specifications (for quick-dry enamels). Moreover, in ARB's letter of March 23, 2000, that requested comments on the draft formulations, we asked commenters to specify alternative formulations or to provide suggestions for modifying the formulations if they had concerns with the draft formulations. While the commenter expressed his concerns, he provided no specific alternative formulations or specific suggestions for modifying the formulations.

19-4. Comment: Quick-dry primers probably would not work on extremely chalky surfaces.

Response: While there may be quick-dry primer, sealer and undercoater coatings available for use on chalky surfaces, specialty primers are specifically designed for application to substrates with excessive chalking. Please refer to the section on specialty primers for further information on product use.

19-5. Comment: Two component swimming pool coatings show blistering and peeling.

Response: Two component epoxies have been used in swimming pools for years, and they are becoming more popular because they last longer than traditional chlorinated rubber coatings. In conversations with manufacturers, there was no mention of blistering and peeling.

COMMENT LETTER #20
Trinity Coatings Company
April 12, 2000

20-1. Comment: The cost of reformulated lacquers to meet the 550 grams per liter requirement will vary widely based on the type of lacquer. For the type of products most often used by the contractor, the raw material cost will increase some 65 to 80 cents per gallon. For some of the higher priced products the cost could remain the same or be a little less because of the acetone used to meet the VOC requirement. It should have been clear at our meeting that the major concern is not cost, but the ability to produce a workable product.

Response: No response is required because the commenter has not stated whether he believes the projected raw material cost increase for lacquers will significantly impact his company, the coatings industry, or consumers. With regard to whether the technology is available for manufacturers to make workable products, this issue is addressed in staff's discussion of technological feasibility presented elsewhere in this report.

20-2. Comment: I hope it was made clear at our meeting that the major concern is not cost, but the ability to produce a workable product. The following problems occur when large quantities of acetone are used in a lacquer formulation: loss of transfer efficiencies, loss of proper flow and leveling, increased danger of flash fires (because of low flash point, 0 degrees F and wide flammability range of acetone 2.59 % to 13 % of atmosphere), formula incompatibility from excess ketone solvent, blushing, and increased viscosity at application because of solvent loss during handling.

Response: We have requested data from the industry to support the following claims regarding acetone: loss of transfer efficiency, loss of proper flow and leveling, formula incompatibility from excess ketone solvent, and increased viscosity at application because of solvent loss during handling. To date we have not received any data to demonstrate these problems. Our data shows products that already comply with this limit. In addition, several major manufacturers have supported the South Coast AQMD's 550 g/l lacquer limit for the last 4 years.

However, acetone-based formulations do suffer from blushing problems under high humidity conditions. Therefore, an exemption allowing a maximum addition of 10 percent by volume of a lacquer retarder on days with relative humidity greater than 70 percent and temperatures below 65 degrees Fahrenheit, has been included in the South Coast AQMD's Rule 1113. Several coating formulators feel that addition of the retarder should mitigate any blushing problems. Although the SCM does not currently contain such a provision, we are working with interested parties to develop such a provision for the SCM when it is presented to the Board at the June 22, 2000, meeting.

Although acetone is flammable, our data show that it is not any more flammable than those products already in use. Labels and MSDSs accompanying acetone-borne products caution the user regarding acetone’s flammability and advise the user to keep the container away from heat, sparks, flames, and all other sources of ignition. The labels also normally warn the user that the vapors may cause flash fire or ignite explosively and to use only with adequate ventilation. These warnings are similar to the warnings found on a vast majority of coating products, including the containers for typical lacquer thinners. A perusal of MSDSs for lacquer thinners manufactured by numerous manufacturers indicated the presence of acetone, ranging from 7 percent to 25 percent by volume. These lacquer thinners are recommended and are used widely for reducing coatings, cleaning equipment, and cleaning paint spills. For more information, please see the Final Program EIR pages IV-94 to IV-96.

20-3. Comment: Included in this letter are six examples, three lower cost utility lacquers and three higher quality performance lacquers. In these groups two formulas that have VOC limits of 550 g/l in the can using the calculation method used to calculate VOC in low solids coatings. If this method were used lacquers could be formulated with performance properties close to those of more conventional lacquers.

Response: Thank you for your formulation information. Please also see response to Comment #7-2 of the Final Program EIR.

20-4. Comment: Nitrocellulose lacquers begin to disappear at a VOC level of around 670 to 700 g/l without use of exempt solvents. Lower VOC coatings using exempt solvents compromise proper solvent balance. Because of the problems stated I would ask that you consider a calculation method using the same procedure to calculate low solid coatings and a VOC limit of 550 g/l as packaged.

Response: Please see the response to Comment #7-2 of the Final Program EIR.

20-5. Comment: The proposed VOC limit for industrial maintenance coatings would virtually eliminate alkyd coatings, which are now widely used. The loss of alkyd coatings would cause some maintenance problems, because there are no replacement coatings that perform as well on poorly prepared surfaces. Water-based acrylic coatings may need an acrylic primer to work well. Plural component coatings work well for their intended purpose, but are not suitable as general purpose coatings.

Response: Proper surface preparation of the substrate is crucial to the performance of any coating, and especially so in the case of high-performance industrial maintenance coatings. Low-VOC acrylic coatings are available now for general purpose use, including single-coat “direct to metal” acrylic coatings that do not need a primer coat. We believe that resin and coating manufacturers are making efforts to develop low-VOC alkyd coatings that may, in the future, comply with the proposed VOC limit for industrial maintenance coatings. In general, we also believe that the proposal provides flexibility to resin and coating manufacturers to continue to develop different types of low-VOC coatings to meet the needs of different industrial end-users.

In the meantime, the SCM includes a “rust preventative” coatings category that is specifically intended to allow limited use of current alkyd coatings. The category is for non-industrial users (*i.e.* residential, commercial, and institutional users) with minimal skill, such as “do-it-yourselfers” and general painting contractors for houses, businesses**,** and institutions**.** Most of the current alkyd coatings in the “rust preventative” category are in the range of 300 to 400 g/l. The VOC limit in the SCM is 400 g/l and is the same as the national limit already in effect for that category. Historically, district rules (except the current South Coast AQMD rule), have generally considered the rust preventative coatings as industrial maintenance coatings.

20-6. Comment: The VOC limit in the National Rule would allow the manufacture of quality industrial maintenance coatings. If one VOC limit applies to all types of industrial maintenance coatings, a more realistic limit other than 250 g/l would be necessary. An alternative is to provide a separate category for alkyd primers and enamels with a VOC limit that would allow these coatings to exist.

Response: The National Rule is intended to be minimum national requirements. Because California has the most severe ozone air quality problem in the nation, California needs to adopt lower VOC limits that are technologically and commercially feasible. Dividing the industrial maintenance category into subcategories would make the proposed SCM provisions more difficult for districts to enforce and create more confusion to the regulated community. We believe that efforts are underway to develop low-VOC alkyd coatings that may, in the future, comply with the proposed limit for industrial maintenance coatings.

The SCM includes a “rust preventative” coatings category that is specifically intended to allow limited use of current alkyd coatings. The category is for non-industrial users (*i.e.* residential, commercial, and institutional users)**.** The VOC limit in the SCM is 400 g/l and is the same as the national limit already in effect for that category. Historically, district rules (except the current South Coast AQMD rule), have considered the rust preventative coatings as industrial maintenance coatings.

20-7. Comment: A VOC content of over 200 g/l is needed to produce a high quality water-based acrylic non-flat coating. Water-based alkyds may run over 300 g/l.

Response: See response to Comments #1-3 and #15-13 of the Final Program EIR. The most common district limit for non-flat coatings is currently 250 g/l, so those coatings above 300 g/l do not currently comply with California district rules.

20-8. Comment: The proposed SCM will result in the loss of many coating systems and could be very damaging. Coatings that have worked well will be lost. In most cases the replacement products will have no history of performance.

Response: The SCM contains proposed VOC limits for over 40 categories of coatings in order to accommodate the variety of different types of architectural coatings. Each of these proposed VOC limits is technologically and commercially feasible as explained in detail in the Draft Program EIR. In fact, there are generally numerous examples of the products that already comply with the proposed VOC limits. It is true, of course, that higher VOC coatings will need to be reformulated, and will no longer be available as they currently exist if the districts in California choose to implement the proposed VOC limits in the SCM. Regarding the performance of the lower VOC products, ARB staff reviewed that results of testing performed by independent contractors and found that overall, the performance of the lower VOC products was comparable to the performance of the higher VOC products.

COMMENT LETTER #21
Tropical Asphalt
April 11, 2000

21-1. Comment: We want to express our concern at your proposal to take the VOC level of bituminous coatings to 250 grams per liter, from the current 300 standard. This change will drastically reduce the workability of our coatings, especially at cold temperatures. The lower VOC will cause an increase in viscosity and will make the products much more difficult to use. It will severely alter our formulations and threaten our existence.

In summary we believe that the standard should remain where it currently is and that instituting your proposed new reduced standard would severely damage our industry.

Response: We are proposing a limit of 300 g/l for bituminous roof coatings. Please see the response to Comment #8b-1 of the Final Program EIR.

21-2. Comment: An even more oppressive proposal is your intention to reduce bituminous primers to 200 grams per liter. A requirement of 200 grams per liter would be the end of solvent-based primers. Exempt solvents are not workable. Only water based or acrylic primers would be possible and they have restrictions. Water-based primers do not penetrate or wet surfaces properly. In addition, our industry ASTM standards would be destroyed. We believe the roofing community would either stop using primer, or blend their “own materials” on the job site which could potentially create a larger VOC problem.

In summary we believe that the standard should remain where it currently is and that instituting your proposed new reduced standard would severely damage our industry.

Response: Bituminous primers were previously regulated under the primers sealers and undercoaters category. We are now proposing a VOC content limit of 350 g/l. This is the most common district limit for primers, sealers, and undercoaters, and has been in existence for about ten years. There are products that meet the proposed standards as well as the ASTM standards. Lower limits are possible, however, for areas with climates similar to that in the South Coast Air Basin. For further information, please see the response to Comment #8a-1 of the Final Program EIR.

Public Workshop Comments
March 16, 2000

1. Comment: The SCM should build consensus. If technical issues are not resolved in the SCM, industry will take up each issue with each district, and will fight to keep adequate coatings.

   Response: The commenter is referred to the response to Comment #15-42 of the Final Program EIR. We have done our best to arrive at consensus on the SCM's provisions. Some decisions were reached only after manufacturers' convincing arguments and data were received between the publication of the Draft Program EIR and the Final Program EIR. While it is industry's right to go to individual districts to argue their case, that potentially results in district-to-district variability in VOC limits, which makes it confusing for manufacturers to comply. The place to bring up and resolve issues is during the development of the SCM.

2. Comment: Manufacturers don't get the same respect as a public agency like Caltrans.

   Response: We disagree. As an example, the SCM does not contain an essential public services category, as in SCAQMD Rule 1113, which gives a higher industrial maintenance coatings limit to essential public service agencies to allow more time for testing and certification of coatings. The SCM gives everyone an additional year to comply with the 250 g/l limit for industrial maintenance coatings. Also, public agencies such as Caltrans, the Metropolitan Water District, Los Angeles Department of Water and Power, and the California Department of Water Resources have been quite free with testing data and have met with us several times to work out issues.

3. Comment: The burden of proof should be on regulators, not manufacturers. You shouldn't expect manufacturers to do your work.

   Response: We believe that it is the job of both regulators and manufacturers to research the issues and come up with reasonable responses. Regulators perform research on categories using all available information, then publish a proposal based on their conclusions. It then becomes the responsibility of the manufacturers to respond with reasonable arguments and data showing why the conclusions are incorrect. It is only with an honest exchange of information that compromises are reached that are the best for air quality, while maintaining the interests of the industry.

4. Comment: ARB shouldn't take enforcement issues into consideration as part of rulemaking.

   Response: We disagree. Enforcement is an essential part of the rulemaking process for both the ARB and the districts. A rule that is not enforceable is not a rule.

5. Comment: Lower VOC flats and nonflats need specific primer/sealer/undercoaters which are higher VOC. Need to look at primers recommended on data sheets (*e.g.*, water-based topcoat assumes a solvent--based primer is available). Need to determine if topcoat will be useful if primer is eliminated by the lower VOC limit.

   Response: Please see the response to Comment #9b-10 of the Final Program EIR.

6. Comment: Acetone has serious safety concerns. Three accidents with fires and deaths have occurred, two homes and one light industrial. Have had successes in factory applications.

   Response: As we explained in the response to comments on lacquers in Appendix D of the Draft Program EIR, many of the solvents used in solvent-based lacquers or other coatings are also flammable and must be handled with care. Acetone's flashpoint temperature, flammability classification and lower explosive limit are similar to other solvents (*e.g.*, MEK, toluene, xylene) found in solvent-based coatings. Flammability classifications by the Fire Department are the same for acetone, MEK, toluene, and xylene. Using operating guidelines for working with flammable coatings under well-ventilated areas, as prescribed by fire department codes, will avoid the concentration of acetone vapors required to cause an explosion. Our understanding of the incidents mentioned is that proper ventilation and other common use guidelines were not followed.

7. Comment: ARB staff should be truthful to the Board and explain that a 150 g/l VOC limit for high gloss paints will result in some sacrifices in performance. The market dictates this to a degree, but the proposed 150 g/l VOC limit amounts to the government dictating a decrement in performance. It is not right to pretend that performance won't be affected by the limit.

   Response: We identified several high gloss exterior (including interior/exterior) coatings on the market with VOC levels less than 150 g/l that are classified as premium quality by their manufacturers. However, as discussed in the response to Comment #1-3 of the Final Program EIR, we have modified the proposed SCM to include a separate subcategory for high gloss coatings with a VOC limit of 250 g/l, primarily due to enforcement concerns.

8. Comment: The EIR should state sacrifices in performance and cost. ARB needs to tell the Board that there will be a loss in performance and increase in cost. Also, consumers will stop buying coating products.

   Response: We disagree that there will be a loss in performance and that consumers will stop buying coating products. We have conducted technology assessments and cost analyses for the coating categories for which we are proposing to lower the VOC limits. Based on these analyses, ARB staff has found that the performance of the low VOC coatings is similar to that of higher VOC coatings. We have also determined that the potential cost increases are within the range of similar regulations adopted by the ARB and districts. There is no evidence that consumers will stop buying coatings because of performance and cost.

9. Comment: Low VOC interior paints may cause an indoor air quality problem, especially with the elimination of mercury as an additive. Glycols act as preservatives, and if you reduce the glycol concentrations in paints, you might see increased health hazards due to microbial growth inside buildings.

Response: Microbial growth on paint after it is applied to the substrate is primarily caused by moisture in the environment and to a lesser degree by warm temperatures. Thus, mildew growth on paint is fairly common in tropical climates. There are numerous non-mercury additives in common use in the coatings industry, including the pigment zinc oxide, that suppress the growth of mildew. Moreover, glycols evaporate after the paint is applied to the substrate and would thus not be retained in the paint over the long term. Further, the SCAQMD reports that independent testing by NTS shows no difference in mildew resistance in the high VOC vs. the low-to-zero-VOC non-flat coatings tested (Naveen Berry, communication with ARB staff, January, 2000).