STAFF REPORT
FOR THE
PROPOSED SUGGESTED CONTROL MEASURE
FOR AUTOMOTIVE COATINGS

Stationary Source Division
Measures Assessment Branch

October 2005

State of California
AIR RESOURCES BOARD

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To be considered by the Air Resources Board on October 20 and 21, 2005, at:

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TABLE OF CONTENTS

TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

ACRONYMS

2002 Survey	2002 Automotive Refinish Survey
APA	Administrative Procedure Act
AQMP	Air Quality Management Plan
ARB/Board	Air Resources Board
ATCM	Airborne Toxic Control Measure
BAAQMD	Bay Area Air Quality Management District
Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health Administration
CAPCOA	California Air Pollution Control Officers' Association
CCAA	California Clean Air Act
CCR	California Code of Regulations
C.E.	Control Efficiency
CESQG	Conditionally Exempt Small Quantity Generators
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRF	Capital Recovery Factor
district	Air Pollution Control or Air Quality Management District
DTSC	Department of Toxic Substances Control
EU	European Union
FCAA	Federal Clean Air Act
g/l	Grams Per Liter
HAP	Hazardous Air Pollutant
HEPA	High Efficiency Particulate Abatement
HRA	Health Risk Assessment
HSC	Health and Safety Code
HVLP	High Volume Low Pressure
MEK	Methyl Ethyl Ketone
NAICS	North American Industry Classification System
NAP	Neighborhood Assessment Program
NIOSH	National Institute for Occupational Safety and Health
NO_x	Nitrogen Oxides
OEHHA	Office of Environmental Health Hazard Assessment
OEM	Original Equipment Manufacturer
PCBTF	Parachlorobenzotrifluoride
PEL	Permissible Exposure Limit
PM	Particulate Matter
PM_{10}	Particulate Matter with an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter less than or equal to 2.5 microns
ppm	parts per million
REL	Reference Exposure Level
ROE	Return On Owner's Equity
RTS	Ready To Spray
SCAQMD	South Coast Air Quality Management District

ACRONYMS

SCM	Suggested Control Measure
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SOA	Secondary organic aerosols
SRP	Scientific Review Panel
SWA	Sales-Weighted Average
TAC	Toxic Air Contaminant
TBAC	Tertiary-Butyl acetate
TCLP	Toxicity Characteristic Leaching Procedure
TE	Transfer Efficiency
tpd	tons per day
TSP	Total Suspended Particulate
ug	Microgram
ug/m3	Micrograms per Cubic Meter
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
VOC_{act}	VOC in grams per liter of coating
VOC_{reg}	VOC in grams per liter of coating, excluding water and exempt compounds

EXECUTIVE SUMMARY

In this executive summary, we provide a summary of the information provided in the staff report. The executive summary is written in "question and answer" format and includes:

- Background;
- SCM development process and evaluation of alternatives;
- Summary of the proposed Suggested Control Measure (SCM);
- Technical analysis of coating categories in the proposed SCM;
- Environmental Impacts;
- Economic Impacts; and
- Future Plans.

I. BACKGROUND

What are automotive coatings?

Automotive coatings, as defined in the SCM, are coatings that are applied to motor vehicles and mobile equipment. Automotive coatings are sold as components that must be mixed to be applied. The main coating categories include primers, color coatings, and clear coatings. These three broad categories of coatings account for about 84 percent of the sales reported in 2001. The remaining sales consist of a variety of coatings such as pretreatment coatings or adhesion promoters intended for use on bare metal or plastics. Automotive coatings, as defined in this SCM, do not include aerosol coatings (e.g., spray paint) or original equipment manufacturer coatings.

What are the emissions from automotive coatings?

The annual average volatile organic compound (VOC) emissions from automotive coatings are estimated to be about 20.7 tons per day in California in 2001 or about two percent of the total stationary source VOC emissions statewide. When automotive coatings are applied, the solvents that hold the coatings in suspension evaporate into the atmosphere and contribute to VOC emissions.

VOC emissions are precursors to the formation of ozone and particulate matter (PM), California's most serious air quality problems. VOCs react photochemically with oxides of nitrogen (NO_x) to form ozone. Ozone is a strong oxidizer that irritates the human respiratory system, increases airway hyperreactivity, increases airway inflammation, and damages plant life and property. Exposure to ozone is also associated with premature death, hospitalization for cardiopulmonary causes, asthma episodes and restrictions in physical activity. VOCs also react in the atmosphere to form PM which consists of very small liquid and solid particles suspended in the air. PM includes particles smaller than 10 microns in size (PM_{10}), as well as the subset of fine particles smaller than 2.5 microns in size ($PM_{2.5}$). PM_{10} and $PM_{2.5}$ are inhaled deeply into the lungs and reduce human pulmonary function. Premature deaths linked to PM_{10} and

$PM_{2.5}$ exposure are now at levels comparable to deaths from motor vehicles and second hand smoke. PM_{10} and $PM_{2.5}$ may also contain toxic compounds. In the atmosphere, PM_{10} and $PM_{2.5}$ reduce visibility.

Who is responsible for controlling VOC emissions from automotive coatings?

Control of emissions from automotive coatings is primarily the responsibility of the local air pollution control and air quality management districts (districts). However, the Air Resources Board (ARB) provides technical support to districts through the development of SCMs and other similar efforts. ARB staff, in cooperation with the districts, has developed the proposed SCM for automotive coatings. The SCM will serve as a model for districts when adopting and amending their automotive coatings rules. The proposed SCM, in part, relies upon the efforts of the Enforcement Managers Committee of the California Air Pollution Control Officers' Association. The proposed SCM reflects nearly four years of study of automotive coatings, and was developed in cooperation with the districts, the United States Environmental Protection Agency (U.S. EPA), and the affected industry.

Why are we proposing the SCM?

We are proposing the SCM to promote consistency and uniformity among district rules and to achieve VOC emission reductions. The proposed SCM will also improve the enforceability of the rules by simplifying coating categories and establishing individual VOC limits for color coatings and clear coatings.

The proposed SCM will achieve significant emission reductions from this category. Many of the facilities that use these coatings are located in or near residential areas and can create disproportionate impacts to neighborhoods. Reducing emissions in neigborhoods is part of the ARB's Environmental Justice Policies and Goals. The emission reductions achieved by the SCM will help the districts meet state implementation plan (SIP) and California Clean Air Act (CCAA) plan requirements.

How are emissions from automotive coatings controlled in the SCM?

Automotive coatings contain solvents which evaporate when they are applied. Most of the solvents used in automotive coatings are VOCs that contribute to California's air quality problems. The SCM controls VOC emissions by establishing limits on the VOC content of automotive coatings. These VOC limits are expressed in grams of VOC per liter of coating, less water and exempt compounds, and vary with each coating category. In general, manufacturers will meet the VOC limits by replacing some of the solvents in automotive coatings with water or other exempt compounds[1], or by increasing the amount of solids, such as resins and pigments or a combination of these approaches.

[1] Solvents with low photochemical reactivity

II. SUMMARY OF PROPOSED SUGGESTED CONTROL MEASURE (SCM)

What automotive coating categories are in the proposed SCM?

As shown in Table ES-1 below, the proposed SCM (see Appendix A) will establish VOC content limits for twelve coating categories of automotive coatings. Many of these automotive coating categories are similar to those in existing district rules. The SCM would lower VOC limits for many categories but would retain some VOC limits currently in effect in California.

Table ES-1 - Proposed Coating Categories and VOC Limits

	VOC regulatory limit as applied Effective January 1, 2009	
Coating Category	**grams/liter**	**(pounds per gallon*)**
Adhesion Promoter	540	4.5
Clear Coating	250	2.1
Color Coating	420	3.5
Multi-Color Coating	680	5.7
Pretreatment Coating	660	5.5
Primer	250	2.1
Single-Stage Coating	340	2.8
Temporary Protective Coating	60	0.5
Truck Bed Liner Coating	310	2.6
Underbody Coating	430	(3.6
Uniform Finish Coating	540	4.5
Any other coating type	250	2.1

* English units are provided for information only. VOC limits are expressed in grams VOC per liter of coating, less water and exempt compounds.

How does the proposed SCM differ from existing district rules?

Current district rules have two sets of VOC limits for automotive coatings. The automotive coatings used on passenger cars typically have higher VOC limits than the automotive coatings used on large vehicles such as trucks and buses (commonly referred to as Group I and Group II vehicles). The district rules also have composite VOC limits for multi-stage systems that apply to the total VOC content of the color coat and clear coat combined. The proposed SCM would establish a single set of VOC limits for all automotive coatings and would eliminate the composite VOC limits for multi-stage systems. The key differences between the proposed SCM and the existing district rules are discussed below.

The SCM:

- Combines the Group I and Group II vehicle categories, and establishes the same VOC limits for passenger vehicles, heavy-duty vehicles, and mobile equipment. This would improve enforcement and simplify recordkeeping;

- Eliminates the composite VOC limit for multi-stage systems, and replaces it with specific VOC limits for clear coatings and color coatings. This would improve enforcement;

- Simplifies and combines district coating categories reducing the total number of categories from thirty-four to twelve. See Table IV-3 in Chapter IV for a list of coating categories typically found in district rules and the corresponding category in the proposed SCM;

- Eliminates the specialty coatings category and replaces it with two specific category limits. The survey data indicate that several coating types qualifying for a high VOC limit under the districts' specialty coatings category were not sold in California in 2001;

- Establishes a prohibition of possession provision, which would prohibit any person from having, at any automotive refinishing facility, coatings or solvents that do not comply with the proposed VOC limits. Only one district rule currently has a prohibition of possession. This would improve enforcement;

- Establishes a 25 grams per liter VOC limit for solvents used in cleaning operations, including surface preparation and spray gun cleaning. This limit is consistent with the most stringent district VOC limit for solvents which is in the South Coast Air Quality Management District (SCAQMD);

- Improves recordkeeping and labeling. The SCM sets consistent recordkeeping requirements for the coating end user. The SCM also establishes labeling requirements for coating manufacturers which would improve enforcement; and

- Exempts tertiary butyl acetate from the VOC definition to provide compliance flexibility.

A more complete discussion of the requirements of the proposed SCM can be found in Chapter III. The proposed regulatory language is in Appendix A. These proposed changes would provide statewide consistency and increase the enforceability of district rules.

Are any products exempt from the SCM?

Yes. The SCM does not apply to original equipment manufacturer (OEM) automotive coatings that are covered by separate district rules. The SCM also does not apply to

aerosol consumer products and aerosol coatings. However, these products are subject to the ARB's statewide consumer products and aerosol coatings regulations, respectively. Products manufactured for use outside of the applicable district, or for shipment to other manufacturers for reformulation or repackaging are also exempt.
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Who would be affected by the proposed SCM?

If adopted by the districts, the proposed SCM would apply to anyone who sells, supplies, offers for sale, or manufactures any automotive coatings for use within the applicable district, as well as any person who applies or solicits the application of any automotive coating within the district. The primary impact would be on manufacturers and users of the coatings. Manufacturers would need to reformulate some products. Distributors of automotive coatings would also be impacted.

Distributors and retailers who must ensure that they are selling or supplying products that comply with the new VOC limits will be impacted. Because of the competitive nature of this industry, some distributors may incur additional costs because they elect to absorb some of the cost to transition automotive refinishing facilities to using lower VOC coatings. Suppliers of resins, solvents, and other ingredients may be impacted, depending on whether demand for their products changes. Although determined to be small, the cost to consumers for vehicle refinishing may increase for some automotive coatings.

Which districts are expected to adopt the proposed SCM?

At a minimum, we expect the 20 districts that currently have automotive coatings rules to amend their rules based on the SCM. These districts are listed in Table ES-2 below. SCAQMD is expected to be the first district to adopt the SCM.

We have worked closely with the districts in developing the SCM. As a result, we encourage districts to adopt the SCM without major changes. We recognize that districts have the authority to include limited and specific exemptions to meet local needs. However, we anticipate that VOC limits, definitions, and implementation dates will not be changed. This will help to achieve uniformity across the State.

Districts without specific rules for automotive coatings may want to consider adopting the SCM to help them achieve the State and federal ambient air quality standards. Districts without specific automotive coatings rules will continue to be subject to the VOC limits in the U.S. EPA's National Rule.

Table ES-2 - Districts with Automotive Coatings Rules	
Antelope Valley APCD	Sacramento Metropolitan AQMD
Bay Area AQMD	San Diego County APCD
Butte County APCD	San Joaquin Valley Unified APCD
El Dorado County APCD	San Luis Obispo County APCD
Feather River AQMD	Santa Barbara County APCD
Glenn County APCD	Shasta County AQMD
Imperial County APCD	South Coast AQMD
Kern County APCD	Tehama County APCD
Mojave Desert AQMD	Ventura County APCD
Placer County APCD	Yolo-Solano County AQMD

III. SCM DEVELOPMENT PROCESS AND EVALUATION OF ALTERNATIVES

How did ARB staff develop the proposed automotive coatings SCM?

The SCM was developed in cooperation with districts, the U.S. EPA, the automotive coatings manufacturers, the collision repair industry, and other interested parties. The SCM development process included the following activities: (1) a comprehensive survey of automotive coatings manufacturers; (2) technical analyses of all the coating categories proposed in the SCM; (3) meetings with districts and U.S. EPA Region IX, and industry representatives; (4) an evaluation of potential environmental impacts; and (5) an analysis of the cost impacts. ARB staff also conducted six public workshops and several meetings and conference calls with individual manufacturers and other interested parties. Table ES-3 provides a chronology of the major meetings held during the SCM development process.

Table ES-3 - Chronology of the Automotive Coatings SCM Development		
Date	**Meeting**	**Location**
April 6, 2005	District Working Group	Sacramento
April 27, 2005	District Working Group	Sacramento
May 26, 2005	Industry and District Conference Call	Sacramento
June 8, 2005	Industry Symposium	Contra Costa College
June 11, 2005	Industry Meeting	Anaheim
June 14, 2005	District Working Group	Sacramento
June 28, 2005	Public Workshop	Diamond Bar
June 30, 2005	Public Workshop	Sacramento
August 9, 2005	Public Workshop	Fresno
August 11, 2005	Public Workshop	Oakland
August 23, 2005	Public Workshop	Diamond Bar
October 5, 2005	Public Workshop	Sacramento

Who has participated in the process?

The districts, the U.S. EPA, automotive coatings manufacturers and marketers, trade associations, and representatives of automotive refinishing facilities have been active in the development of the proposed SCM.

What information was gathered in the ARB's 2002 Automotive Coatings Survey?

The ARB's 2002 Automotive Coatings Survey (2002 Survey) collected detailed sales and formulation data from 17 manufacturers that sold automotive coatings in California in 2001. This information was collected by coating category, and was provided either on a product specific basis, or for a group of products in the case of color coatings. The 2002 Survey also requested for each product, or group of products, the complete formulation (the speciation of the VOC ingredients, exempt solvents, and solids). See Appendix B for complete details of the type of information collected as part of the 2002 Survey. The technical information gathered in the 2002 Survey was used, along with other information, to develop the proposed SCM.

Did ARB staff evaluate alternatives to the proposed SCM?

Yes. Under the California Environmental Quality Act (CEQA), project alternatives should be identified in the Environmental Impact Assessment. Alternatives include measures for attaining the objectives of the proposed project. The alternatives analysis provides a means for evaluating the comparative merits of each alternative. An alternative evaluating the merits of not having the project must also be included. The alternatives considered feasible are then evaluated for potential environmental impacts that may result from their implementation.

The following alternatives were considered, but were rejected in favor of the proposed SCM:

1) No project, assuming that the SCM will not be adopted; and
2) Extending the effective date from January 1, 2009 to January 1, 2010;

The no project alternative was rejected because it would not achieve emission reductions necessary to attain the State and federal ambient air quality standards. The extended effective date alternative was rejected because compliant coatings are currently available or will be available before the proposed effective date of January 1, 2009.

How were the proposed VOC limits in the SCM established?

Although some of the VOC limits in the proposed SCM are equivalent to those in SCAQMD's Rule 1151, ARB staff performed an independent analysis of each of the proposed VOC limits. These analyses are included in Chapter IV of the staff report. In proposing each of the VOC limits, ARB staff considered: (1) the results of the ARB's 2002 Survey; (2) the number of complying products currently on the market; (3) discussions with coating manufacturers, marketers and representatives of automotive refinishing facilities; and (4) trade journals and other literature related to the product category. As mentioned previously, the proposed VOC limits are the result of extensive interaction with the affected coatings industry, including discussions during six public workshops and several meetings and conference calls. Although each of the proposed limits is based on factors unique to each individual coating category, the following guiding principles were applied:

- Technological and commercial feasibility - assuring that reformulation technologies will be available by the effective date for each proposed limit, and that the overall performance of complying products will be similar to that of noncomplying products.

- Emission reductions achieved - assuring that our overall proposal will achieve the maximum feasible reduction in emissions.

- Minimize the potential for the use of Toxic Air Contaminants (TAC) - assuring that the proposal can be met without a significant increased use of TACs.

IV. COMPLIANCE WITH THE SCM PROPOSAL

How will manufacturers reformulate their products to comply with the VOC limits?

Manufacturers of coatings above the proposed VOC limits will need to reformulate some of their products to meet the applicable VOC limits. Manufacturers have the flexibility to choose any formulation that meets the applicable VOC limits and the reformulation options vary with each coating category (see Chapter IV of the staff report). In general, VOC solvents will need to be reduced by increasing the amount of water, exempt solvents, or coating solids. In solvent-borne products, VOC solvents may be partially replaced with exempt solvents such as acetone, parachlorobenzotrifluoride (PCBTF) or tertiary butyl acetate (if districts exempt TBAC from their VOC definitions). These changes may also require the use of different resin systems. For example, a higher solids formulation may need to use a less viscous resin system to improve flow and leveling. Solvent-borne products may also be reformulated to a water-borne system. As mentioned previously, ARB staff has proposed VOC limits that can be met without an increase in the use of TACs.

For the color coating category, there are water-borne coatings available that meet the proposed VOC limit. Water-borne color coatings have been used in Europe for about ten years and are being mandated there as of January 1, 2007. Manufacturers' literature for water-borne color coatings indicate that they perform as well as solvent-borne color coatings when applied properly.

Manufacturers have stated that additional color development is required before the water-borne color coatings that are currently marketed in Europe can be fully introduced in California. While manufacturers have indicated that most likely they will meet the color coating limit with water-borne coatings, they do not rule out the possibility of a solvent-borne reformulation option.

Are the VOC limits proposed in the SCM technologically and commercially feasible?

Yes. Most of the VOC limits in the proposed SCM are based on coating technologies that have been available since 2001. ARB staff analyzed our 2002 Survey data, consulted with coating manufacturers, evaluated coatings being used in Europe, and reviewed technical literature to determine appropriate VOC limits. As explained in detail in Chapter IV of the staff report, staff believes all of the VOC limits in the proposed SCM are technologically and commercially feasible by the effective date.

Our 2002 Survey results demonstrate that for nearly all the coating categories proposed in the SCM, products are currently available that comply with the proposed limits. Nine of the twelve categories for which we are proposing VOC limits have products that would meet the proposed limits. The complying marketshares vary with each coating category; however, this is not unexpected since the current VOC requirements also vary throughout the State. The coating category called "any other coating type" has no complying products because it was established as a catch-all category for which no products were reported in the 2002 Survey. Only two coating categories with reported products, adhesion promoters and pretreatment coatings, do not currently have compliant products in the marketplace. However, at least one coating manufacturer has indicated that they will sell compliant coatings in these categories prior to the 2009 effective date. Staff will conduct a technology assessment approximately one year prior to the implementation date for all the VOC limits that are more stringent than existing district limits. This technology review is a standard practice for identifying any unanticipated problems prior to implementation of the proposed VOC limits.

Will the reformulated products perform similar to existing products?

Yes. ARB staff concluded that the performance of the compliant products would be similar to the performance of their higher VOC counterparts. This conclusion is based on:

1) The current availability of complying products in the marketplace;

2) ARB staff's analyses of each product category, as detailed in Chapter IV; and
3) The extended use of complying products both here and in Europe in the case of water-borne color coatings.

What will the automotive refinishing facilities need to do to comply with the proposed SCM?

Automotive refinishing facilities will need to use compliant coatings or use control devices to reduce VOC emissions from their operations. Currently, only a few automotive refinishing facilities use control devices to reduce VOC emissions. If manufacturers comply with the proposed VOC limit for color coatings with water-borne coatings, automotive refinishing facilities may need to purchase air movement equipment and may need to install heaters to accelerate drying. There are several technology options that can be used by automotive refinishing facilities depending on their specific needs and their current equipment configurations. Smaller facilities may be able to purchase less expensive air movement equipment and may not need to install heaters because they have a lower volume of production. Chapter VII and Appendix C present our analysis of the costs automotive refinishing facilities may incur to comply with the proposed SCM.

What are the emission reduction benefits from the automotive coatings SCM proposal?

The total emission reduction from statewide implementation of the proposed VOC limits is estimated to be about 13.4 tons per day (tpd) in California. This reduction equates to about a 63 percent reduction in the total VOC emissions from the coating categories in the SCM.

Table ES-4 shows the estimated emission reductions by coating category.

Table ES-4 - Estimated Emission Reductions from Automotive Coatings

Coating Category	Emission Reduction (tpd)
adhesion promoter	.02
Clear coating	1.61
Color coating	8.78
Multi-color coating	N/A
Pretreatment coating	.21
Primer	1.01
Single-stage coating	1.68
temporary protective coating	<.01
Truck bed liner coating	<.01
underbody coating	<.01
uniform finish coating	.05
any other coating type	N/A
Total	**13.4**

V. ENVIRONMENTAL IMPACTS

Both CEQA and ARB policies require the ARB to evaluate the potential adverse environmental impacts of proposed projects. The ARB is authorized to prepare a plan or other written document (such as an environmental analysis chapter in the staff report) in lieu of an environmental impact report. Chapter VI presents a detailed analysis of the environmental impacts of the proposed SCM.

What are the expected environmental benefits of the automotive coatings SCM?

The primary environmental benefit of the SCM will be a reduction in the formation of tropospheric (ground level) ozone, PM_{10} and $PM_{2.5}$. It has long been known that exposure to ground level ozone, PM_{10} and $PM_{2.5}$ have adverse impacts on public health. Research has shown that, when inhaled, ozone, PM_{10} and $PM_{2.5}$ can cause respiratory problems, aggravate asthma, and impair the immune system.

In the presence of sunlight, the VOCs from automotive coatings and other sources react with oxides of nitrogen (NO_x) to form ozone. In addition, VOCs have been found to be a source of PM_{10} and $PM_{2.5}$, either through condensation of the VOCs or complex reactions of VOCs with other compounds in the atmosphere. Therefore, districts that adopt the SCM will reduce their VOC emissions and experience a positive impact on air quality and public health. The exact reductions in ozone, PM_{10} and $PM_{2.5}$ cannot be accurately predicted due to the wide variety of factors that impact the formation of ozone, PM_{10} and $PM_{2.5}$. These factors include atmospheric conditions, the ratio of VOCs to NO_x in the atmosphere, and the reactivity (ozone formation potential) of the individual VOCs emitted. However, numerous scientific studies have shown that by reducing VOC emissions, ozone, PM_{10} and $PM_{2.5}$ concentrations are reduced. Therefore, by reducing ozone and PM concentrations, this SCM would reduce the health risks posed by exposure to these pollutants.

Additionally, automotive coatings contain several known TACs such as toluene, xylenes, and methyl ethyl ketone (MEK). To the extent these are reduced by the reformulation to lower VOC coatings, there would be a decrease in TAC emissions. Currently, these compounds account for over 27 percent of the VOC emissions. If districts exempt TBAC from their VOC definitions, it may be used as a substitute for toluene, xylenes and MEK, which would decrease the use of these TACs. The extent of TBAC substitution could vary by coating category, however, it is believed that as much as 50 percent of the toluene, xylenes, and MEK could be replaced with TBAC. Because many automotive refinishing facilities are located in or near low-income residential areas, decreasing TAC emissions from automotive coatings would benefit environmental justice communities.

Are there any potential significant adverse environmental impacts?

No. In Chapter VI, we examined the potential effect of the proposed SCM on air quality, water demand, water quality, public services (public facility maintenance, fire protection), transportation and circulation, solid waste/hazardous waste, and hazards to the public or the environment. Based on our analysis, we do not expect any significant adverse environmental impacts to result from the implementation of the proposed SCM.

There is a slight potential for an adverse environmental impact if districts exempt TBAC from their VOC definitions. The Office of Environmental Health Hazard Assessment has determined that TBAC is a potential carcinogen because it metabolizes to tertiary butyl alcohol. Assuming under a worst-case scenario that TBAC is substituted for 50 percent of the toluene, xylenes, and MEK in automotive coatings, the maximum potential cancer risk is estimated to be 2.8 excess lifetime cancer cases per million for a resident living near the largest known auto body shop (1,100 gallons per year). However, if the VOC limit for color coatings is met with water-borne coatings, the maximum potential cancer risk would be reduced to about 1.4 excess lifetime cancer cases per million.

VI. ECONOMIC IMPACTS

How did ARB staff evaluate the potential economic impacts of the proposed SCM?

ARB staff evaluated the economic impacts of the proposed SCM by: 1) contacting coating manufacturers; 2) comparing the ingredient costs of typical low VOC formulations with higher VOC formulations; and 3) contacting spray booth equipment and air movement equipment manufacturers. The analysis assumes that all districts adopt the proposed SCM, including areas that are now subject to the U.S. EPA National Rule. As detailed below, this information was used to perform a business impacts analysis and a cost-effectiveness analysis for the SCM.

How was the business impacts analysis conducted and what are the results?

In our economic impact analysis, we evaluated the potential impact of the proposed VOC limits on profitability and other aspects of businesses subject to the limits. To conduct our analysis, we relied on information provided by coating manufacturers, ingredient costs for typical complying and noncomplying formulations, and information from manufacturers of spray equipment and air movement equipment. We then evaluated the impact of these costs on typical businesses using a combination of publicly available financial databases (Dun and Bradstreet and Ward's Business Directory of United States Manufacturing Industries), industry journals/literature such as the Chemical Market Reporter, and discussions with industry representatives.

We utilized the change in "return-on-owner's equity" (ROE) as an indicator of the SCM's potential impacts on business profitability. The cost to comply with the proposed SCM, through increased research and development, equipment purchases, and increased ingredients costs is presumed to impact a business' ROE and therefore its profitability. Our analysis indicates that the total annualized cost to comply with the proposed SCM is about $14 million. The average annual cost to automotive coating manufacturers is estimated to be about $320,000. This results in an average estimated change in ROE of 0.07 percent. The average annual cost to automotive refinishing facilities is estimated to be about $3,400 resulting in an average change in ROE of 15 percent. This cost estimate assumes that coating manufacturers pass on all of their costs to the automotive refinishing facilities. The estimated change in ROE for automotive refinishing facilities would be significant if the costs are not passed on to the consumers.

Our ROE analysis for the proposed SCM may overestimate the impact on businesses because it assumes that all of the costs of the proposed SCM will either be absorbed by the coating manufacturers or the automotive refinishing facilities. In reality, we expect that at least some of the investment costs to comply with the proposed VOC limits will be passed on to consumers. For example, an automotive refinishing facility could pass their entire costs on to consumers by adding $11 to an average repair cost. Adding $11 to an average repair cost would increase the repair cost by only 0.5 percent. The analysis also does not quantify the extent of cost mitigation due to "technology-transfer" between product lines.

While we expect that most businesses will be able to absorb the costs of the proposed limits without significant adverse impacts on their profitability, there is the possibility that some individual businesses will be adversely affected when districts adopt the proposed SCM. Therefore, it is possible that the proposed SCM may have a significant adverse impact on some businesses that are not in a market position to invest monies to develop new low VOC products, or to absorb the increased cost resulting from their compliance with the proposed SCM.

Based on our analysis, we do not expect the proposed limits in the SCM to have a significant impact on employment, or business creation, elimination, or expansion. We also do not expect the proposed SCM to have a significant impact on the competitiveness of California businesses compared with those outside of California. This is because all companies that sell these products in the State would have to meet the proposed requirements, whether located in or outside of California.

The VOC limits in the proposed SCM will primarily impact automotive coatings manufacturers and automotive refinishing facilities that use those coatings. However, we recognize that other industries could also be impacted to a lesser amount, which is difficult to quantify. These industries include distributors, retailers, and "upstream" suppliers who supply solvents and other chemicals used in automotive coatings.

Distributors and retailers could be impacted because they need to ensure that noncomplying products are not sold after the implementation date. In addition, the current market dynamics are such that often distributors or manufacturers provide incentives to customers in order to obtain and maintain accounts. While this is the cost of doing business, the changes may require some new equipment that distributors would likely be expected to provide. However, we are unable to quantify the magnitude of such costs because industry wide data are not available nor are the incentives consistent across the industry.

Upstream suppliers could be impacted because manufacturers will be purchasing some different solvents and other materials for their reformulated products. However, we do not expect these changes to result in a major impact on the affected industries because chemical companies generally supply many different industries, and because many of the upstream suppliers also provide the alternative products which will be used in the reformulated products. In fact, we expect some upstream suppliers will benefit since the proposed limits are likely to create new or increased demand for materials to be used in compliant formulations.

Will the proposed SCM be cost-effective?

Yes. Cost-effectiveness is one measure of the SCM's efficiency in reducing a given amount of pollutant (often reported in "dollars (to be) spent per pound of VOC reduced"). The methodology used to determine cost-effectiveness is well established and often used to compare a proposed regulation's cost-efficiency with those of other regulations. To calculate the cost-effectiveness of the SCM, we divided the estimated total annual cost to manufacturers and automotive refinishing facilities by the total emission reduction. To conduct our analysis, we relied on specific formulation data from the 2002 Survey, industry journals/literature such as the Chemical Market Reporter for ingredient unit prices, and discussions with industry representatives. We estimate the cost-effectiveness weighted by emissions reductions across all the proposed limits to be about $1.43 per pound of VOC reduced. This estimated cost-effectiveness value is within the typical range of costs of existing ARB control measures and district rules.

Will automotive refinishing facilities have to pay more for automotive coatings subject to the proposed SCM?

Yes. Automotive refinishing facilities may have to pay more for some products subject to the automotive coatings SCM, depending on the extent to which manufacturers are able to pass along their costs to automotive refinishing facilities. While the raw material costs for compliant coatings is comparable or, in some cases, less costly than that of higher VOC coatings, typically there is a premium charged by paint manufacturers for new coatings. It is not possible to quantify the potential price increase per gallon of coating because most manufacturers did not provide cost data as part of the survey.

Will consumers have to pay more for automotive repairs?

Yes. As discussed in Chapter VII of the staff report, assuming that all the costs of the proposed SCM are passed along to the consumers who need automotive repairs, the average cost of a repair would increase by about $11. The average repair cost is estimated to be about $2,200.

VII. FUTURE PLANS

What happens if the Board approves the proposed SCM?

If the Board approves the proposed SCM, staff will assist the districts, if requested, as they embark in their own rulemakings to incorporate the SCM into their local rules.

Will ARB staff track industry's progress toward meeting the proposed VOC limits?

Yes. Staff plans to conduct technology assessments for all of the proposed VOC limits that are more stringent than existing district limits at least one year prior to the 2009 effective date. We believe that the proposed limits are feasible based on all the evidence available to us. However, it is standard practice for the ARB to conduct these reviews to ensure that unanticipated problems do not arise.

VIII. RECOMMENDATION

Staff recommends that the Board approve the proposed SCM and direct staff to transmit the SCM to the districts for consideration.

I. BACKGROUND

In this staff report, we present the results of an evaluation of automotive coatings which led to our proposal for a Suggested Control Measure (SCM). The assessment included: a survey of automotive coatings sold in California in 2001; an examination of several compliance flexibility options; technical assessments for the various coating categories; an environmental impact assessment; and a cost impact analysis. The proposed SCM for automotive coatings is the first collaborative regulatory effort undertaken by the Air Resources Board (ARB/Board) staff, the air pollution control or air quality management districts (districts), and affected industry representatives for this coating category. The development of the SCM was the direct result of a request from the districts for ARB to provide technical assistance to improve the consistency and enforceability of existing rules.

A. OVERVIEW

Automotive coatings are coatings used, or recommended for use, in motor vehicles or mobile equipment refinishing, repair, or restoration. Typical automotive coatings include primers, color coatings and clear coatings. These coatings are used for refinishing vehicles such as: automobiles, trucks, buses, golf carts, vans, motorcycles, tanks, armored personnel carriers, trains, railcars, truck trailers, mobile cranes, bulldozers and street cleaners. The estimated volatile organic compound (VOC) emissions from automotive coatings in California were about 20.7 tons per day (tpd), on an annual average basis, in 2001. This represents about two percent of the total stationary source VOC emissions.

VOCs are precursors to the formation of ozone and particulate matter (PM). Ozone and PM are two of the most serious air pollutants for which the State and national ambient air quality standards are exceeded in much of California. Ozone is formed from photochemical reaction of oxides of nitrogen and VOCs. Scientific studies show that exposure to ozone can result in reduced lung function, increased respiratory symptoms, increased airway hyperreactivity, and increased airway inflammation. Exposure to ozone is also associated with premature death, hospitalization for cardiopulmonary causes, asthma episodes and restrictions in physical activity. Ozone is a strong oxidizer and exposure to levels of ozone exceeding the current ambient air quality standards lead to a variety of adverse health effects, as well as a reduction of crop and timber production, and damage to plants and property. Emissions of VOCs also react in the atmosphere to form PM_{10} and $PM_{2.5}$. Inhalation of PM_{10} and $PM_{2.5}$ deep into the lungs reduces human pulmonary function. Premature deaths linked to PM_{10} and $PM_{2.5}$ exposure are now at levels comparable to deaths from motor vehicle accidents and second-hand smoke. Attaining the current State ambient air quality standards for PM_{10} and ozone would annually prevent approximately 6,500 premature deaths or three percent of all deaths in California. (ARB, 2002)

B. AUTOMOTIVE COATINGS MANUFACTURERS

The automotive coatings market in California was estimated at approximately 3.7 million gallons in 2001. Approximately 95 percent of the total sales for 2001 were supplied by seven manufacturers. Table I-1 lists the top seven manufacturers based on data reported in the 2002 Survey (ARB, 2005).

Automotive coatings are normally supplied to automotive refinishing facilities through a network of distributors (jobbers). The distributors are generally independent businesses or may be owned by the coating manufacturer (e.g., Sherwin Williams). Most distributors sell coatings locally or regionally.

Table I-1 - Top Seven Coatings Manufacturers

Company	Scope
Akzo Nobel	Global
BASF	Global
DuPont	Global
Ellis Paint	California
PPG	Global
Sherwin Williams	Global
Standox/Spies Hecker	Global

Automotive coatings are formulated using solids and liquids. The solids consist of three main categories: (1) resins (polymers or binders) bind the pigments and additives together and form a film upon drying. Sometimes co-polymers are used to modify the properties of the primary resin. Some resins used in automotive coatings include alkyds, latex, oils, vinyl, acrylics, celluloses, epoxies, urethanes, and polyurethanes; (2) pigments are finely ground powders dispersed in the coating; pigments provide color, hide the underlying surface, and contribute other properties; and (3) additives or specialty chemicals which assist in manufacture and application, may improve the properties of the finished film. Examples of additives include preservatives, wetting agents, coalescing agents, freeze-thaw stabilizers, anti-foam agents, and thickeners. Liquids are usually solvents, which are the volatile carriers used to control the viscosity of the coating and provide application properties. Some typical solvents used are: aromatic or aliphatic hydrocarbons, ketones, esters, alcohols, glycols, glycol ethers, and water.

Most automotive coatings are sold as components with a few available for use in ready-to-use containers. The coating components are mixed in the automotive refinishing facility, as needed, by the painter, prior to use. Mixing ratios of components can vary depending on temperature and other factors. Generally, to make the coating ready to spray, the process requires combining the base product with a VOC solvent, water, or an exempt solvent depending upon the manufacturer's specifications for reaching the correct viscosity for spraying application. Colors normally require inter-mixing various toners in order to achieve the desired color.

Table I-2 is a chronology of the development of automotive coatings technologies (Entec, 2000). Most automotive refinishing facilities have a “mixing bank”, and may use an automatic mixing machine to insure precise color formulations. Small operations use ready-to-spray (RTS) coatings or will acquire the mixed coatings from a supplier or jobber.

Table I-2 - Chronology of Development of Coating Technologies	
Date	**Coating Technology**
1920s	Nitrocellulose Resins
1950s	Alkyd Resins
1960s	Thermoplastic Acrylic Resins
1970s	2 Component Polyurethane-Acrylic Resins
1990s	High Solids Urethanes

C. AUTOMOTIVE REFINISHING FACILITIES

Automotive coatings operations are conducted at automotive refinishing facilities which include auto body repair/paint shops, production auto body paint shops, new car dealer repair/paint shops, fleet operator repair/paint shops and custom restoration facilities. Some of these facilities do collision repair and some do commercial vehicle refinish and repair. While we do not have a specific breakdown of facilities doing commercial (fleet) vehicle refinish only, we expect this group to be relatively small. Most of the facilities perform collision repair and refinishing for the passenger car segment with some performing mostly complete paint jobs (i.e., facilities such as MAACO and Earl Scheib).

The total number of facilities involved in the repair and refinishing of vehicles is estimated to range from about 4,000 to over 6,000. (DuPont, 2005; DCA, 2005). Many of these operations do not have a district permit because they use relatively small volumes of coatings. Some districts do not require a permit if a facility uses less than a specified volume of coatings and cleaning solvents, typically one gallon per day. However, most districts require a permit if a facility has a spray booth, regardless of the volume of coatings and cleaning solvents used.

The majority of automotive refinishing facilities are small businesses typically having from one to five employees. Table I-3 lists the number of facilities based on gross annual revenue. Over 70 percent of automotive refinishing facilities are estimated to have one million dollars or less in annual revenue (DuPont, 2005). Some of these facilities may be doing body repair work without painting the vehicle. We are aware that some facilities subcontract the painting portion of the repair job. However, we are unable to quantify the number of facilities involved only in body repair.

Table I-3 - Distribution of Automotive Refinishing Facilities Grouped by Total Annual Revenue in 2002		
Total Annual Revenue	**Number of Facilities**	**Percent of Total**
Less than $0.5 Million	2,074	50.4
$0.5 to $1 Million	878	21.3
>$1 to $2.5 Million	883	21.5
> $2.5 Million	278	6.8
Total Statewide	4,113	100

The automotive refinishing facilities vary greatly in size and level of sophistication. Some automotive refinishing facilities are medium to large, well run, relatively automated facilities while others are family-run shops, which may have one or two employees. Table I-4 shows the estimated number of automotive refinishing facilities in the larger districts. (DuPont, 2005)

Table I-4 - Estimated Number of Automotive Refinishing Facilities by District	
District	**Number of Facilities**
South Coast Air Quality Management District (SCAQMD)	1,790
Bay Area Air Quality Management District (BAAQMD)	934
San Joaquin Valley Air Pollution Control District (SJUVAPCD)	330
Sacramento Metropolitan Air Quality Management District (SMAQMD)	171
Other Districts	888
Total Statewide	4,113

D. REGULATORY AUTHORITY

In California, the districts have primary responsibility for controlling emissions from automotive refinishing facilities. In 1988, the districts began to develop regulations for automotive coatings and refinishing operations.

1. District Rules in California

Typically, the districts develop regulations that define coating categories and set VOC limits that affect manufacturers, suppliers, and users of automotive coatings. The rules establish VOC content limits to achieve the maximum feasible emission reductions. Coatings that are high in VOCs are either replaced with an existing low-VOC coating, or are reformulated to meet the VOC limits established in the rules.

The ARB has authority to oversee the districts' activities. In consultation with the districts, the affected industry and the U.S. EPA, ARB staff developed the proposed SCM. The SCM will be used as a model by the districts when adopting or amending their automotive coatings rules. The SCM will provide uniformity and enhance enforcement of district rules. In Chapter III, we provide a detailed description of the proposed SCM.

Twenty of the 35 districts in California have rules regarding automotive coatings. Currently, approximately 95 percent of the State's population is covered by the existing district rules. Most of the rules have been included in the State's Implementation Plan (SIP). Table I-5 lists the districts' rules for this category.

Table I-5 - Existing District Rules

District	Rule Number	Adopted	Last Amended
Antelope Valley APCD	1151	7-8-88	7-20-99
Bay Area AQMD	8-45	6-7-89	7-1-99
Butte County APCD	235	6-19-97	8-22-02
El Dorado County APCD	230	9-27-94	
Feather River AQMD	3-19	8-6-98	
Glenn County APCD	V-105	5-19-99	
Imperial County APCD	427	9-14-99	
Kern County APCD	410-4A	5-16-91	3-7-96
Mojave Desert AQMD	1116	3-2-92	4-12-99
Placer County APCD	234	11-3-94	4-9-98
Sacramento Metropolitan AQMD	459	12-7-95	10-2-97
San Diego County APCD	67-20	11-13-96	8-13-97
San Joaquin Valley APCD	4602	4-11-91	12-20-01
San Luis Obispo County APCD	423	2-23-88	11-13-02
Santa Barbara County APCD	339	8-13-97	4-17-19
Shasta County AQMD	3-25	4-1-97	
South Coast AQMD	1151	7-8-88	12-11-98
Tehama County APCD	4-35	11-10-98	
Ventura County APCD	74-18	1-28-92	9-10-96
Yolo-Solano County AQMD	2-26	8-13-97	

Although there are some similarities in the district rules, the rules vary from district to district. Some of the differences include: definitions of terms, coating categories, VOC limits, exemptions allowed, and recordkeeping requirements. Table I-6 summarizes the key VOC limits from four district rules.

Table I-6 – Summary of VOC Limits

	SCAQMD Rule 1151		SJUVAPCD Rule 4602		SMAQMD Rule 459		BAAQMD Rule 8-45	
	Cars*	Large** Vehicles	Cars	Large Vehicles	Cars	Large Vehicles	Cars	Large Vehicles
Category	g/l	g/l	g/l	g/l	g/l	g/l	g/l	g/l
Pretreatment Wash Primer	780	780	780	780	780	780	780	780
Precoat	N/A	N/A	600	600	600	600	580	580
Primer/Primer Surfacer	250	250	250	250	250	250	250	250
Primer Sealer	340	250	420	340	420	250	420	340
Topcoat	420	340	420	420	420	420	420	420
Metallic Iridescent Topcoat	420	340	520	420	520	420	520	420
Multi-stage Topcoat	420	340	540	N/A	540	N/A	540	N/A
Specialty Coating	840	840	840	840	840	840	840	840
Camouflage	N/A	N/A	N/A	420	N/A	420	N/A	420
Multi-Colored	685	685	N/A	N/A	N/A	N/A	N/A	N/A
Multi-Colored Multistage	420	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rubberized Asphaltic Underbody	N/A	N/A	N/A	N/A	540	540	N/A	N/A
Temporary Protective Coating	N/A	N/A	60	60	60	60	N/A	N/A

* *Passenger cars, small-sized trucks and vans, medium-sized trucks and vans, motor homes and motorcycles.*

** *Large sized trucks, buses and mobile equipment*

2. The National Automotive Coatings Rule

The districts that do not have their own rule for automotive coatings implement U.S. EPA's national rule. In the 1990 Clean Air Act Amendments, the United States Congress enacted section 183(e), which established a new regulatory program for controlling VOC emissions from consumer and commercial products. Section 183(e) directs the U.S. EPA Administrator to determine the ozone forming potential of these products, and to prioritize the need for regulation of these products.

The U.S. EPA promulgated a final rule to control VOC emissions from automotive refinish coatings, such as primers and topcoats on August 14, 1998. The national rule was published in the Federal Register on September 11, 1998 (EPA, 1998). This rule was specifically aimed at manufacturers and importers of automotive coatings. However, the national rule had little effect on the rules already adopted by the districts. The VOC limits in the district rules are generally more stringent than those in the national rule.

3. California Clean Air Act

In addition to the federal planning requirements, the CCAA imposes a separate set of planning requirements on 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 for ozone by the earliest practicable date. The Board sets the State ozone standards. In March 2005, the Board reviewed California's 1-hour standard for ozone and determined that it alone was not sufficiently protecting human health. Consequently, ARB adopted a new 8-hour standard for ozone and retained the existing 1-hour ozone standard. California's ozone standards are:

- 1-hour average standard at 0.09 ppm, not to be exceeded
- 8-hour average standard at 0.070 ppm, not to be exceeded

California's new 8-hour ozone standard is more stringent than the federal 8-hour ozone standard of 0.08 ppm. The U.S. EPA recently eliminated the national 1-hour ozone standard of 0.12 ppm and replaced it with their 8-hour ozone standard. As specified in the CCAA, the ARB has designated areas of California to be in "attainment" or "nonattainment" for the State ozone standards. The districts that are nonattainment for the State ozone standards are required by the CCAA to prepare plans, which must be designed to achieve and maintain the standards by the earliest practicable date. Each nonattainment district is also required to update their plans every three years to include the latest technical information, and any changes in demographics or other relevant information. In developing their plans, each district determines which measures are necessary to include, as well as the specific details of each included measure. In many of the nonattainment districts, substantial additional emission reductions will be necessary in order to achieve and maintain the State ozone standards. By revising their existing rules to be consistent with the SCM, the districts can achieve greater emission reductions to help them attain the ozone standards.

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II. DEVELOPMENT PROCESS FOR SCM

Development of the SCM was initiated by ARB staff in cooperation with the districts. The key objectives of the SCM are to: (1) improve the overall effectiveness and enforceability of district rules; (2) improve consistency among district rules; and (3) achieve VOC emission reductions.

Development of the SCM included the following activities:

- Conducting a survey of automotive coatings manufacturers;
- Conducting meetings with districts, U.S. EPA Region IX representatives, and representatives of the affected industry;
- Reviewing existing district rules and the National Volatile Organic Compound Emission Standards for Automobile Refinish Coatings;
- Holding public workshops and meetings with individual manufacturers, distributors, automotive refinishing facility owners, and other interested parties;
- Assessing and evaluating existing coatings technologies for the categories; and
- Preparing a comprehensive emissions and cost analysis.

A. AUTOMOTIVE COATINGS 2002 SURVEY (2002 Survey)

In 2001, ARB staff began working with manufacturers and industry groups to develop a new survey of automotive coatings sold in California. In 2002, ARB sent out the Automotive Refinish Survey seeking 2001 product ingredient and sales data. A draft 2002 Survey report was made available to industry in March 2005. Appendix B is a copy of the survey. The 2002 Survey report can be obtained from the SCM webpage at http://www.arb.ca.gov/coatings/autorefin/scm/scm.htm.

B. DISTRICTS AND U.S. EPA

ARB staff formed a working group with districts and U.S. EPA staff to assist in the development of the SCM. The main objectives of the working group meetings were to discuss:

- The needs of the districts regarding the implementation of the SCM;
- The emission reductions achievable from automotive coatings;
- Findings of the 2002 Survey;
- Specific regulatory language; and
- Flexibility options for manufacturers to comply with new automotive coatings regulations.

C. PUBLIC PROCESS

A vital element of the SCM development process is the participation of members of the industry and other affected parties. The ARB staff held a series of public workshops. These workshops were attended by representatives from industry (e.g., manufacturers and suppliers of automotive coatings and components, ingredient manufacturers, automotive refinishing facility owners and trade associations), districts, the U.S. EPA, and other interested parties. In addition to the public workshops, ARB staff held meetings with individual manufacturers and distributors, as well as automotive refinishing facility owners to ascertain their concerns, and accept suggestions and necessary data. Table II -1 lists the public workshops and meetings staff conducted as part of the SCM development process.

Table II-1 - List of Public Workshops and Meetings

Date	Type of Meeting	Location
April 6, 2005	District Working Group	Sacramento
April 27, 2005	District Working Group	Sacramento
May 26, 2005	District Working Group	Sacramento
June 8, 2005	Industry Symposium	Contra Costa College
June 11, 2005	Industry Meeting	Anaheim
June 14, 2005	District Working Group	Sacramento
June 28, 2005	Public Workshop	Diamond Bar
June 30, 2005	Public Workshop	Sacramento
August 9, 2005	Public Workshop	Fresno
August 11, 2005	Public Workshop	Oakland
August 23, 2005	Public Workshop	Diamond Bar
October 5, 2005	Public Workshop	Sacramento

During the development of the SCM, a series of documents were created. The documents include: SCM draft regulatory language, working group invitations, public workshop notifications and meeting notices, as well as reports, and other correspondence and communication. In an effort to include all interested parties in the development process, an extensive mailing list of over 6,000 recipients was compiled that included manufacturers, suppliers, automotive refinishing facilities, district contacts, U.S. EPA contacts, trade associations, and other interested parties. Web and list serve pages dedicated to the SCM were developed. The webpage was used to post relevant documents, announcements, and staff contact information. The list serve page assisted in the distribution and assimilation of information regarding the development of the SCM. The function of the list serve was to inform over 165 subscribers of all additions and updates to the SCM webpage.

D. EVALUATION OF THE DISTRICT RULES AND NATIONAL RULE

The motivation for developing the SCM was to provide consistency in district rules, increase rule enforceability, and achieve the maximum feasible reduction in VOC emissions. The national rule applies to manufacturers and importers of automotive coatings. In contrast, the SCM applies to suppliers, sellers, manufacturers, or anyone that distributes any automotive coating, the components, or associated solvent for use within the district, as well as any person who uses, applies, or solicits the use or application of any automotive coating or associated solvent within the district. Since the district rules have limits that are equal to, or lower than, the limits in the national rule, the objective of the SCM is to set limits that are at least or more stringent than those in existing district rules. The national rule specifically allows states or local governments to adopt more stringent emission limits.

E. TECHNOLOGY ASSESSMENT

An essential element of developing the SCM was to assess the technical feasibility of the proposed limits for the coatings categories. Staff conducted a technology assessment for all the coating categories included in the SCM. Some of the sources of information utilized in the technology assessment included:

- The ARB 2002 Survey data;
- Manufacturers' brochures and product technical data sheets;
- Product labels and material safety data sheets;
- Internet websites;
- Books and trade magazines;
- Technical reports and training manuals;
- Discussions with manufacturers, suppliers, and users of coatings;
- District rules and discussions with district staff; and
- Information from trade associations.

The proposed VOC limits for the coating categories in the SCM are based on our assessment of detailed information from manufacturers on coatings sold in 2001. Staff evaluated technical data provided by the manufacturers for coatings in each category. Staff evaluated the coatings, solids content by volume, and VOC content, as well as other characteristics. The technology assessment for the SCM is discussed in Chapter IV.

F. COST ANALYSIS

Although it is not required under the California Administrative Procedure Act (APA), the economic impact of the SCM on affected businesses and consumers was evaluated and quantified. In 2002, the ARB sent a survey to manufacturers of automotive coatings. The formulation data received from this survey was one of the sources of information used to perform a cost-effectiveness analysis and a business impacts analysis. The cost-effectiveness analysis measures how cost-efficient the proposed SCM will be in reducing VOCs relative to other regulatory programs. The business impacts analysis evaluates the impacts on profitability, employment, and competitiveness to California businesses, consumers, and government agencies.

Staff used survey formulation data and performed research to identify typical non-complying and complying formulations for the coating categories, and the relative cost of raw materials were estimated for these formulations. Examples of sources of information for the cost analysis were: the 2002 Survey; material safety data sheets; formulations data provided by coating manufacturers; equipment manufacturers; district staff; trade magazines; and Internet searches. Results of the cost analysis are reported in Chapter VII.

III. PROPOSED SUGGESTED CONTROL MEASURE

In this chapter, we provide a plain English discussion of the staff's proposed SCM for automotive coatings, which is contained in Appendix A. All sections of the proposed SCM are discussed below. Where applicable, key terms or concepts of the proposed SCM are discussed.

Control of emissions from automotive coatings is primarily the responsibility of the districts. The proposed SCM may be used as a model by the districts when adopting and amending their local automotive coatings rules. Accordingly, throughout the staff report references are made to the most common or most restrictive district VOC limits, since the district rules are the enforceable regulations.

A. APPLICABILITY

The proposed SCM applies to manufacturers, distributors, sellers, and users of automotive coatings, but does not apply to aerosol coatings in containers of any size. The proposed SCM applies to coatings that are used to coat any part or component of motor vehicles (such as cars, buses, and golf carts) or mobile equipment (such as railcars and tractors). For the complete definitions of motor vehicle and mobile equipment, please see sections 3.19 and 3.20 of the proposed SCM. The proposed SCM also applies to manufacturers, distributors, sellers, and users of solvents used in cleaning operations.

B. DEFINITIONS

To help clarify and enforce the proposed SCM, section 3 of the proposed SCM provides definitions for terms used which are not self-explanatory. This section also provides equations to determine the VOC content of automotive coatings.

C. STANDARDS

The proposed SCM differs from the U.S. EPA's national rule and current district rules by eliminating the composite VOC limit for basecoat (color) and clear coating systems. The composite VOC limit is being replaced with individual VOC limits for color coatings and clear coatings. A total of 12 VOC limits are proposed, which would become effective on or after January 1, 2009.

The table of standards in the proposed SCM, reprinted below as Table III-1, contains the proposed limits for maximum VOC content in each category of automotive coatings. If the coating is represented in such a way that indicates it can be used in more than one of the coating categories listed in Table III-1, then the lowest, or most restrictive, VOC content limit will apply.

If a coating does not meet any of the definitions for the specific categories listed in Table III-1, that coating will fall into the category labeled “Any other coating type” and the VOC limit of 250 grams per liter (g/l) will apply. Limits are expressed in grams of VOC per liter of coating thinned to the manufacturer’s maximum recommendation, excluding the volume of any water and exempt compounds.

Table III-1 - Proposed Coating Categories and VOC Limits

Coating Category	VOC regulatory limit as applied Effective January 1, 2009	
	grams/liter	(pounds per gallon*)
Adhesion Promoter	540	4.5
Clear Coating	250	2.1
Color Coating	420	3.5
Multi-Color Coating	680	5.7
Pretreatment Coating	660	5.5
Primer	250	2.1
Single-Stage Coating	340	2.8
Temporary Protective Coating	60	0.5
Truck Bed Liner Coating	310	2.6
Underbody Coating	430	(3.6
Uniform Finish Coating	540	4.5
Any other coating type	250	2.1

* English units are provided for information only. VOC limits are expressed in grams VOC per liter of coating, less water and exempt compounds.

The proposed SCM also prohibits anyone from applying, manufacturing, blending, repackaging for sale, supplying, offering for sale, distributing, possessing (at an automotive refinishing facility) or selling any coating that does not meet the VOC limits listed in Table III-1, except when the coating is sold for use with an approved emission control system that is at least 85 percent efficient. It is a violation of the proposed SCM to solicit, require or specify the use of a coating that does not meet the VOC limits set forth in Table III-1, unless the coatings are used at a facility that complies with section 4.3 (alternative compliance provisions).

The standards section specifies the manner in which coatings may be applied. With the exception of underbody coatings, truck bed liner coatings, coatings used in graphic arts and coatings of any type if less than one fluid ounce, the automotive coating must be applied by brushing, dipping, rolling, electrostatic spraying, or spraying with a high-volume, low-pressure spray (HVLP) gun or an approved equivalent.

Section 4.8 of the proposed SCM also prohibits the use of solvents that exceed a VOC content of 25 g/l at an automotive refinishing facility, and specifies that any VOC-containing materials or products must be stored in closed, vapor-tight containers when not in use. Spray guns must be cleaned in a closed system or its approved equivalent.

D. ADMINISTRATIVE REQUIREMENTS

The proposed SCM requires each manufacturer to provide written data for each of their products that includes the physical properties of the coating, coating component, or solvent. For a complete description of what information must be included on the manufacturer data sheets, please see sections 5.1.1, 5.1.2, and 5.1.3 of the proposed SCM. Manufacturers must also clearly label all coatings and coating components with the applicable use categories listed in Table III-1 and the VOC content. Manufacturers must label solvents with the VOC content.

The proposed SCM requires that those who use automotive coatings or solvents at automotive refinishing facilities keep records indicating the name and manufacturer of the coating or solvent, method of applying the coating or solvent, coating type and mix ratio, VOC content of the coating or solvent, and whether the product used is a coating or a solvent. This information, along with manufacturer's data sheets or other written materials that provide the actual and regulatory VOC content and purchase records listing the coating type, name, and volume of coatings or solvents must be kept at the location where the coatings are applied for a minimum of three years. These records are to be made available for inspection upon request.

Anyone using an approved emission control system per section 4.3 instead of using coatings that meet the VOC limits in Table III-1 must keep daily records, to be maintained for a minimum of three years. These records will prove continuous and correct use of the control system during the time that emissions are occurring.

The proposed SCM specifies that no person shall manufacture, blend, repackage for sale, supply, sell, offer for sale, or distribute or apply any automotive coating or automotive coating component that does not meet the VOC limits in the proposed SCM. However, if the coating is for use exclusively within an emission control system or outside the district, a person may manufacture, blend, repackage for sale, supply, sell, offer for sale, or distribute an automotive coating or component that does not meet the VOC limits. In this situation, that person must keep records of the quantity manufactured, blended, repackaged, supplied, sold, offered for sale, or distributed; size and number of containers; VOC content; name, address, phone number, retail tax license number, and valid district permit number for the person to whom or for whom the coating or component was manufactured, blended, repackaged, supplied, sold, offered for sale or distributed; and whether the coating is for use in an approved emissions control system or outside the district. As with all records pertaining to the proposed SCM, this information must be kept for a minimum of three years and be made available for inspection upon request.

E. TEST METHODS

Test methods for automotive coatings and solvents subject to the proposed SCM are provided in this section. These include tests for metallic and acid content, tests for the determination of various exempt compounds, a method for determining VOC content of solvents or coatings, tests to determine control and transfer efficiency, and a method to determine if a spray gun's transfer efficiency is equivalent to that of a HVLP spray gun. Please see section 6 of the proposed SCM for complete descriptions and reference numbers for these test methods.

IV. DESCRIPTION AND TECHNICAL ASSESSMENT OF THE COATING CATEGORIES AND SOLVENTS

A. INTRODUCTION

To ensure that the proposed SCM is technologically and commercially feasible, we considered the following:

1) The results of the 2002 Automotive Coatings Survey;
2) Information from automotive coating manufacturers, solvent suppliers, and other industry groups;
3) The existing VOC limits for automotive coatings and solvents; and
4) The results of our technical analyses of all the coating categories proposed in the SCM.

Based on the technical analyses, we believe that the overall performance of the reformulated products in each category will be similar to the performance of their higher VOC counterparts. Except for the adhesion promoter and pretreatment coating categories, complying products are commonly available and currently being used. However, we will conduct technology reviews for the proposed VOC limits that are lower than the most stringent limits in existing district rules prior to the effective date of those limits.

In this chapter, we provide a discussion of the automotive coating categories and the solvents included in the proposed SCM. The coating categories are adhesion promoter, clear coating, color coating, multi-color coating, pretreatment coating (formerly called pretreatment wash primer), primer, single-stage coating (formerly called topcoat), temporary protective coating, truck bed liner coating, underbody coating, uniform finish coating, and any other coating type.

Appendix D discusses categories that are currently in district rules or the national rule, but which are not specifically listed in the proposed SCM. These coating categories are multi-stage topcoat system, specialty coating, metallic/iridescent, primer sealer, primer surfacer, camouflage, precoat, extreme performance coatings, elastomeric material, anti-glare safety coating, impact resistant coating, water hold-out coating, weld-thru coating, bright metal trim repair, gloss flatteners, heat resistant, and jambing (cut-in) clear coat.

The structure of the proposed SCM differs significantly from existing district rules. Currently, the district rules and the U.S. EPA automotive coatings rule allow for a composite VOC limit for “multi-stage topcoat” systems. The SCM replaces the composite VOC limit with specific VOC limits for clear and color coatings.

Also, the proposed SCM eliminates the distinction between Group I and Group II vehicle categories, and establishes the same VOC limits for coatings used on passenger vehicles, heavy-duty vehicles, and mobile equipment. The SCM will clarify and, where applicable, combine coating categories. The SCM eliminates the specialty coatings category and replaces it with specific category limits as needed. The 2002 Survey data indicated that several of the coating types currently allowed under the specialty coatings category are no longer sold in California.

Most of the coatings have two or more individual components that are combined into one formulation. For example, a color coating may be a combination of up to ten individual toners plus hardeners, reducers, and specialty additives. As such, we cannot determine the volume applied of any single mixture. For an estimate of the emissions from each coating category, we assumed that an equal amount of base material was used in every formulation that could be made with that base material.

ARB staff analyzed the survey data to propose appropriate VOC limits, as listed in Chapter III, Table III-1. Table IV-1 shows the number of companies that reported coatings that meet the proposed VOC limits in the SCM. Table IV-2 shows coating categories found in the existing district rules and their corresponding category in the proposed SCM.

Table IV-1 - Compliance Summary

	Coating Category										
Number of Companies that:	Adhesion Promoter	Clear	Color ***	Multi-color	Pretreat-ment	Primer	Single Stage ***	Temporary Protective	Truck Bed Liner	Under-body	Uniform Finish
Sold type of coating in CA	5	15	12	0	13	15	13	2	1	3	5
Reported mixtures	4	14	11	0	11	14	10	2	1	3	3
Reported valid mixtures *	4	14	11	0	11	14	10	2	1	3	3
Reported compliant mixtures **	0	11	5	0	0	12	1	1	1	2	1

17 companies responded to survey.

* Mixtures are considered valid if ARB has all necessary information for all components of the mixture and the information for each component met ARB standards.

** Mixtures that meet the VOC limits proposed in the SCM.

*** Single-Stage and Color Coatings are reported for systems and not individual mixtures.

Table IV-2 - Comparison of Coating Categories	
Existing District Categories	**SCM Categories**
Camouflage	Color Coating
Extreme Performance	Primer, Color Coating, Clear Coating, Single-Stage Coating, or Underbody Coating
General Topcoat	Single-Stage Coating
Metallic/Iridescent Topcoat	Single-Stage Coating
Multi-Color Multi-stage	Multi-Color Coating
Multi-Color Topcoat	Multi-Color Coating
Multi-stage Topcoat (aka Multi-stage Topcoat System)	Color Coating & Clear Coating
Precoat	Primer
Pretreatment Wash Primer (aka Pretreatment or Pretreatment Coating)	Pretreatment Coating
Primer	Primer
Primer Sealer	Primer
Primer Surfacer	Primer
Rubberized Asphaltic Underbody	Underbody Coating
Single-Stage Nonmetallic/Noniridescent Topcoat	Single-Stage Coating
Single-Stage Metallic/Iridescent Coating	Single-Stage Coating
Solid Color Topcoat	Single-Stage Coating
Temporary Protective Coating	Temporary Protective Coating
Topcoat (aka All Other Topcoats)	Single-Stage Coating
Specialty Coatings	The generic category has been eliminated and replaced with specific categories for the various coatings previously grouped together and are addressed below.
Adhesion promoter	Primer or Adhesion Promoter
Anti-glare Safety Coating (aka Antiglare/Safety Coatings)	Clear Coating, Color Coating, or Single-Stage Coating
Bright Metal Trim Repair Coating	Any Other Coating Type
Camouflage	Color Coating
Elastomeric Materials (aka Elastomeric Coatings)	Primer, Color Coating, Clear Coating, Single-Stage Coating, or Underbody Coating
Extreme Performance	Primer, Color Coating, Clear Coating, Single-Stage Coating, or Underbody Coating
Gloss Flatteners (aka Low-Gloss Coatings)	Clear Coating
Heat Resistant	Primer, Color Coating, Clear Coating, or Single-Stage Coating
Impact Resistant Coating	Single-Stage Coating, Clear Coating,

Table IV-2 - Comparison of Coating Categories	
Existing District Categories	**SCM Categories**
	Underbody Coating, or Truck Bed Liner Coating
Jambing (Cut-In) Clear Coats	Clear Coating
Multi-Color Coatings	Multi-Color Coatings
Rubberized Asphaltic Underbody Coating	Underbody Coating
Uniform Finish Blenders (aka Finish Blenders)	Uniform Finish Coating
Water Hold-Out Coating	Primer
Weld-Thru Coatings (aka Weld-Thru Primers and Weld-Through Primer)	Primer

B. CATEGORIES THAT ARE IN THE SCM

This section describes each of the categories in the SCM. Chapter V, Table V-3, details the estimated emissions and anticipated emission reductions, in tpd, from each category in the proposed SCM. Table IV-3, at the end of this section, provides basic physical parameters for each coating category in the proposed SCM. Table IV-4 shows the number of compliant mixtures and complying marketshare for each coating category as of 2001. All averages expressed in this chapter are simple, arithmetic averages.

1. Adhesion Promoter

Adhesion promoters are coatings applied directly to uncoated plastic surfaces to facilitate bonding of subsequent coatings. All adhesion promoter mixtures reported in the 2002 Survey are solvent-borne coatings. None of the mixtures reported contain any water or exempt compounds. Other than resins, the solids include pigments and various other compounds. These include proprietary compounds, titanium dioxide, talc, and barium sulfate.

The proposed VOC limit of 540 g/l is technologically and commercially feasible by the January 1, 2009, effective date based on discussions with coating manufacturers. Manufacturers may increase the exempt compound content in order to comply with the proposed VOC limit. Five companies reported selling adhesion promoter coatings in the 2002 Survey. None of the four companies that reported complete and valid information for adhesion promoters have coatings that meet the proposed limit. One coating manufacturer has stated that they expect to have a product that meets the proposed VOC limit in the market by 2008.

Issues:

1. Issue: No product currently meets the proposed limit.

   Response: Manufacturers may add exempt compounds to their coatings to meet the proposed VOC limit.

   Below is a sample formulation of a compliant adhesion promoter. This is intended to illustrate how the VOC content could be lowered to meet the proposed VOC limit. In developing this formulation, we relied on nearly compliant formulations of existing mixtures and increased the amount of exempt compounds. The volume percent is derived from the weight percent and individual densities of compounds in the coating formulation. To protect data confidentiality, the formula below groups various solids and VOCs together.

Ingredient	**Wt %**	**Vol %**
resin	19	17.4
solids	18	5.9
TBAC (or other exempts)	29.5	35.5
VOCs	33.5	41.2
total	100	100
solids	37	23.3
exempts	29.5	35.5
VOC	33.5	41.2
overall density (g/cm3)	1.04	
VOC limit	**540**	**g/l**
VOCreg	**539.0**	**g/l**
VOCact	**347.6**	**g/l**

This is a small usage category, about 3,600 gallons in 2001. If compliant products are formulated with TBAC, the emissions of TBAC from this coating category would be only 25 lbs per day statewide. Exempts other than TBAC could be used to achieve the same VOC content.

2. Clear Coating

Clear coatings are coatings that contain no pigments and are applied over a color coating or clear coating. All clear coating mixtures reported in the 2002 Survey are solvent-borne coatings. The coatings employ a variety of solvents that manufacturers mix to vary the rate of evaporation of the carrier (solvent). Many of the mixtures reported contain trace to minor amounts of water.

Over half of the mixtures reported contain exempt compounds. In those mixtures, the exempt content, by weight, ranges from about one-half percent up to sixty-six percent. Overall, the average exempt compound content is about nine percent by weight.

The majority of the solid content of a clear coating is resin. Some clear coatings have materials such as talc and silica to disperse light and create a matted appearance. Other clear coatings have plasticizers or flexiblizing agents added to create an elastomeric coating. Other than resins, the solids include proprietary compounds, silica, ultra-violet light absorbers, light stabilizers, and many other compounds in minor amounts.

The proposed VOC limit of 250 g/l is technologically and commercially feasible by the January 1, 2009, effective date. The SCAQMD Rule 1151 requires that all manufacturers who offer clear coatings for sale in the district offer at least one product line with a VOC content of 2.1 lbs/gal (250 g/l) or less. Fifteen companies reported selling clear coatings in the 2002 Survey. Eleven of the fourteen companies that reported complete and valid information for clear coatings have coatings that meet the proposed limit.

Issues:

1. Issue: Low gloss/matted clears need a higher VOC limit to accommodate the additives that are used to disperse light.

   Response: Manufacturers currently add a flattening agent to a high gloss clear coating to achieve a low gloss coating. This formulation approach results in an unnecessarily high VOC content. The VOC content of low gloss clear coatings could be reduced to 250 g/l if products are formulated directly as low gloss products.

   Issue: Elastomeric clears need a higher VOC limit.

   Response: The ARB has been informed that elastomeric/flex additives are currently available at 1.9 lb/gal (228 g/l) which would enable an elastomeric clear coating to achieve the 250 g/l VOC limit.

3. Issue: Compliant solvent-borne clear coatings have not been tested for compatibility with water-borne color coatings.

   Response: The ARB has found manufacturer data sheets that indicate that at least two companies market 250 g/l clear coatings that are compatible with their respective water-borne color coating systems. The PPG Corporation stated at the fourth public workshop in Oakland that it has a compliant solvent-borne clear coating that is marketed for use with its water-borne color coatings.

3. Color Coating

Color coatings are pigmented coatings, excluding adhesion promoters, primers and multi-color coatings, that require a subsequent clear coating. Color coatings include metallic/iridescent color coatings. These coatings were previously called basecoats and midcoats as part of the multi-stage systems in district rules. These coatings require a subsequent clear coating for protection, durability, and gloss.

Two companies reported sales of water-borne systems in the 2002 Survey. Another company reported three specific water-borne mixtures. All other coatings in this category are solvent-borne. Many mixtures reported contain trace to minor amounts of water. Exempt compounds are in about half of the mixtures reported. In those mixtures with exempt compounds, the amount of exempt compounds ranged from one-tenth of a percent to seventy-three percent by weight. Overall, the average amount of exempt compounds was three percent by weight.

This is the largest emitting category of automotive coatings. Color coatings account for about 60 percent of the VOC emissions from automotive coatings. Other than resins, the solids include pigments and various other compounds. These include titanium dioxide, mica, nickel compounds, iron compounds, rutile, aluminum, silica, carbon black, molybdenum compounds, tin compounds, barium sulfate, copper compounds, and numerous other compounds.

Most of the major manufacturers have water-borne color coatings that have been developed to comply with European Union (EU) emission standards. The EU directive will require all manufacturers to meet a 420 g/l VOC limit for color coatings as of January 1, 2007. The EU does not allow the use of exempt compounds to comply with the VOC content limit. Consequently, manufacturers have developed water-borne technologies to meet the EU VOC limit.

Based on discussions with manufacturers, they intend to use these water-borne systems to comply with the proposed SCM VOC limit. Thus, the proposed VOC limit of 420 g/l is technologically and commercially feasible by the January 1, 2009, effective date. Twelve companies reported selling color coatings in the 2002 Survey. Six of the eleven companies that reported complete and valid information for color coatings have solvent-borne systems that meet the proposed limit currently in use in California. However, these solvent-borne systems are only used for fleet vehicles, not for passenger vehicles that have greater performance demands.

If manufacturers choose to comply with the color coating limit with water-borne coatings, this will be a significant change from the current use of high VOC solvent-borne coatings. It will likely require changes by the end users, including the addition of air movement equipment to quickly dry the water-borne coatings and perhaps heat to maintain current production levels.

4. Multi-Color Coating

Multi-color coatings are coatings that exhibit more than one color in the dried film after a single application, are packaged in a single container, and hide surface defects on areas of heavy use. These coatings are commonly called “splatter” coatings due to their appearance. They are more commonly used in industrial settings and on items such as small fishing boats.

No coatings in this category were reported as being sold in California in 2001. We have found this type of coating marketed on the internet, with one of the listed uses being automotive. We have assumed that everyone who markets this coating is in compliance with the current national limit.

The proposed VOC limit of 680 g/l is technologically and commercially feasible. The proposed limit is the same as the current limit of 680 g/l in the *National Volatile Organic Compound Emission Standards for Automobile Refinish Coatings, 40CFR59, Sections 59.100 through 59.111, and Table 1 to Subpart B*.

5. Pretreatment Coating

Pretreatment coatings contain a minimum of one-half (0.5) percent acid by weight to provide surface etching, and not more than 16 percent solids by weight. They are applied directly to bare metal surfaces to provide corrosion resistance and adhesion. The SCAQMD and Antelope Valley AQMD are the only districts that limit the solids content of pretreatment coatings. Limiting the solids content is intended to reduce film build from a pretreatment coating, thereby reducing the incentive to use a high VOC content material as a primer able to fill large scratches or voids.

All of the reported mixtures in the 2002 Survey are solvent-borne. Of the 57 reported mixtures, 48 mixtures contain negligible to minor amounts of water. Water content ranges up to almost four percent by weight. Of the 57 reported mixtures, 43 mixtures do not contain any exempt compounds. Six mixtures have about one percent exempt compounds by weight and the remainder of mixtures range from two percent up to 15 percent exempt compounds by weight. Of the coatings that meet the solids content provision of the SCM, most do not use any exempts. The maximum exempt content found in the coatings that meet the solids content provision is approximately six percent. Other than resins, the solids include pigments and various other compounds. These include titanium dioxide, talc, zinc compounds, iron oxide, calcium carbonate, zinc phosphate, silica, and numerous other compounds. The primary acid used is phosphoric acid.

ARB staff believes the proposed VOC limit of 660 g/l is technologically and commercially feasible by the January 1, 2009 effective date based on discussions with the coating manufacturers (current limit is 780 g/l). One coating manufacturer has stated that they expect to have a pretreatment coating that meets the proposed limit on the market by the end of 2005.

One mixture reported in the 2002 Survey had a VOC content of 660 g/l, however, its solids content was greater than 16 percent, by weight. We believe it is possible for manufacturers to increase the exempt compound content in order to comply with the proposed VOC limit. Thirteen companies reported selling pretreatment coatings in the 2002 Survey. Eleven companies reported complete and valid information for pretreatment coatings, however, none have coatings that meet the proposed limit.

Issues:

1. Issue: No product currently meets the proposed limit.

   Response: ARB staff believes that the manufacturers have time to reformulate their coatings to meet the proposed limit. Because no products currently meet the proposed VOC limit, we will conduct a technology assessment approximately one year before the effective date of the limit.

   Below is a sample formulation of a compliant pretreatment coating. This is intended to illustrate how the VOC content could be lowered to meet the proposed VOC limit. In developing this formulation, ARB staff relied on nearly compliant formulations of existing mixtures and increased the amount of exempt compounds. The volume percent is derived from the weight percent and individual densities of compounds in the coating formulation. To protect data confidentiality, the formula below groups various solids and VOCs together for display.

Ingredient	Wt %	Vol %
Resin	5.5	4.4
Solids	9.1	2.5
phosphoric acid	1.4	0.8
Acetone (or other exempts)	7.5	8.6
TBAC (or other exempts)	41.5	43.5
VOCs	35	40.3
Total	100	100
Solids	16	7.7
Exempts	49	52.1
VOC	35	40.3
overall density (g/cm3)	0.90	
VOC limit	**660**	**g/l**
VOCreg	**659.4**	**g/l**
VOCact	**316.0**	**g/l**

This is a small usage category, about 45,000 gallons in 2001. If compliant products were formulated with TBAC, the emissions of TBAC from this coating category would be less than 400 lbs per day statewide.

6. Primer

The primer category currently exists in district rules. The SCM retains it and expands it to include the current district coating categories of primer surfacers and primer sealers. Most districts have the same VOC limit for primers and primer surfacers. Currently, the VOC limit for primer sealers is slightly higher (e.g., 340 g/l in SCAQMD). Primers are coatings applied to a substrate to provide:

1) A bond between the substrate and subsequent coats;
2) Corrosion resistance;
3) A smooth substrate surface; or
4) Resistance to penetration of subsequent coats. Some primers are pigmented to allow the painter to use less color coating to achieve the desired color.

The vast majority of primers reported in the 2002 Survey are solvent-borne, with only a small percentage being water-borne. One mixture of primer, four mixtures of sealer, 14 mixtures of surfacer, and one mixture of precoat are water-borne. All other mixtures reported are solvent-borne.

Almost 75 percent of the primers reported contain exempt compounds. For those mixtures with exempt compounds, the exempt content ranges from one-tenth of a percent to almost 64 percent, by weight, with the average exempt content being just under six percent.

The resin content varies widely within the primer category depending upon usage and manufacturer, from a low of 0.2 percent to a high of 57 percent, by weight, both of which are in the surfacer subcategory. Most primers have approximately 20 to 29 percent resin, by weight. Other than resins, the solids include pigments and various other compounds. These include barium sulfate, talc, titanium dioxide, calcium carbonate, zinc phosphate, mica, clay, aluminum, iron oxide, magnesium carbonate, and numerous other compounds.

The proposed VOC limit of 250 g/l is technologically and commercially feasible by the January 1, 2009, effective date. SCAQMD's Rule 1151 already requires all primers, primer surfacers, and primer sealers used on large vehicles and mobile equipment to meet a VOC content of 250 g/l. Fifteen companies reported selling primers in the 2002 Survey. Twelve of the 14 companies that reported complete and valid information for primers have coatings that meet the proposed limit.

Issues:

During the SCM development process, manufacturers requested a 340 g/l VOC limit for sealers. The reasons cited for the need for a higher VOC limit and our responses are discussed below.

1. Issue: Sealers have a lower solids content than surfacers and therefore cannot meet the same limit.

   Response: ARB staff analyzed the solids content of surfacers and sealers and found that while there were differences between the solids contents for any given manufacturer, the differences were insignificant when compared to the differences between manufacturers. The ranges for any given manufacturer overlapped, as well as between manufacturers. One manufacturer has stated that it will not be difficult to meet the proposed limit for sealers using exempts in the solvent mix.

2. Issue: Sealers have less pigment and more resin than surfacers and therefore need a higher limit.

   Response: ARB staff analyzed the types of solids in the sealers and surfacers and found that there is a lot of overlap between the ranges of the types of solids in sealers and surfacers. ARB staff believes that both products can meet the proposed limit. One manufacturer has stated that it will not be difficult to meet the proposed limit for sealers using exempts in the solvent mix.

7. Single-Stage Coating

Single-stage coatings are pigmented coatings, excluding primers and multi-color coatings, for application without a subsequent clear coating. Single-stage coatings include metallic/iridescent single-stage coatings. This is an older coating technology that is diminishing in usage in the collision repair industry. It is being replaced by color coating/clear coating systems that use less material and provide a higher gloss with a more durable finish. Single-stage coatings are used mostly in production shops where the entire vehicle is painted, and a single coating can achieve the desired color, protection and durability in one application.

All but two of the reported mixtures of single-stage coatings in the 2002 Survey are solvent-borne. Only about four percent of reported mixtures contain water. For most of these mixtures, the water content is negligible. Four mixtures contain significant amounts of water, ranging from 25 to 55 percent, by weight.

Over half of the mixtures reported do not contain any exempt compounds. In the remaining mixtures the exempt content, on a mass basis, increases gradually from 0.5 percent up to a maximum exempt content of 61 percent, by weight.

Other than resins, the solids include pigments and various other compounds. These include mica, titanium dioxide, iron oxide, talc, copper compounds, aluminum, barium sulfate, carbon black, silica, nickel compounds, and numerous other compounds.

The proposed VOC limit of 340 g/l is technologically and commercially feasible by the January 1, 2009, effective date. SCAQMD Rule 1151 currently requires all single-stage coatings used on large vehicles and mobile equipment to meet a VOC limit of 340 g/l. The proposed SCM extends the 340 g/l VOC limit in SCAQMD to all vehicles, including passenger cars. Thirteen companies reported selling single-stage coatings in the 2002 Survey. One of the ten companies that reported complete and valid information for single-stage coatings has a complete single-stage system that meets the proposed limit.

Issues:

1. Issue: Metallic single-stage coatings at the proposed limit do not currently exist for the automotive market.

   Response: There were some metallic single-stage coatings sold in 2001 that comply with the proposed VOC limit. One manufacturer has stated that they have a complete single-stage system, including metallics, that complies with the proposed limit.

However, based on discussions with manufacturers, it appears that single-stage coatings are not a good technology for metallic coatings. Currently, pearl or iridescent coatings are only achieved by using a color coating/clear coating technology. It appears that the best way to achieve a metallic coating is to use a color coating/clear coating technology. This is due to the way the paint film is created in single-stage coatings. The metallic flakes are not spread evenly throughout the film and reside only near the surface of the film making them more susceptible to damage, both mechanical and chemical. This would alter the appearance of the paint. Whereas in a color coating/clear coating system, the metallic flakes are fully protected by the clear coating.

8. Temporary Protective Coating

Temporary protective coatings are coatings used to temporarily protect areas from overspray or mechanical damage. These coatings are commonly used instead of taping off an area before painting another area or applied prior to shipping a vehicle. These coatings are removed after a primer or topcoat application, or after a vehicle reaches its destination.

Both of the reported mixtures of temporary protective coatings in the 2002 Survey are water-borne. Neither of the mixtures reported contains any exempt compounds. Other than resins, the solids include pigments and various other compounds.

The proposed VOC limit of 60 g/l is technologically and commercially feasible by the January 1, 2009, effective date. Several district rules currently require temporary protective coatings to meet a VOC limit of 60 g/l. Two companies reported selling temporary protective coatings in the 2002 Survey. One of the two companies that reported complete and valid information for temporary protective coatings has a coating that meets the proposed limit.

9. Truck Bed Liner Coating

Truck bed liner coatings are coatings for application to a truck bed to protect it from surface abrasion. These coatings do not include clear coatings, color coatings, multi-color coatings, or single-stage coatings. These coatings are often a rubbery type of coating that provides traction and keeps materials from dinging or scratching the bed. The one reported mixture of truck bed liner coatings in the 2002 Survey is solvent-borne. It contains no water or exempt compounds. Other than resins, the solids include pigments and various other compounds.

The proposed VOC limit of 310 g/l is technologically and commercially feasible by the January 1, 2009, effective date. One company reported selling truck bed liner coatings in the 2002 Survey. The company reported complete and valid information, and the coating meets the proposed VOC limit.

10. Underbody Coating

Underbody coatings (formerly called “rubberized asphaltic underbody coatings”) are applied to wheel wells, the inside of door panels or fenders, the underside of a trunk or hood, or the underside of the motor vehicle itself. The coatings are typically used for sound deadening or protection. ARB staff changed the name of the category to “Underbody Coating” and modified the definition to also include coatings with a similar purpose that do not contain rubberized asphalt.

Only four districts define this type of coating, and some districts do not list it as a specialty coating in their specialty coating definition. Of the four districts that define this type of coating, three districts have it specifically listed as a specialty coating. Sacramento Metropolitan AQMD has a limit of 540 g/l for these coatings.

Five of the six mixtures reported are solvent-borne; the remaining mixture is water-borne. None of the solvent-borne coatings contain any water. None of the reported mixtures, whether solvent-borne or water-borne, contain any exempt compounds.

Other than resins, the solids include pigments and various other compounds. These include talc, calcium carbonate, titanium dioxide, and iron oxide.

The proposed VOC limit of 430 g/l is technologically and commercially feasible by the January 1, 2009, effective date based on data provided by the coating manufacturers. Three companies reported underbody coatings in the 2002 Survey. Three companies reported complete and valid information and two companies have coatings that meet the proposed limit.

11. Uniform Finish Coating

Uniform finish coatings are coatings applied to the area around a spot repair for the purpose of blending a repaired area’s color or clear coating to match the appearance of an adjacent area’s existing coating. While all districts except for one identify this as a specialty coating, only five districts and the national rule define the coating.

All of the coatings reported as uniform finish coatings in the 2002 Survey are solvent-borne. None of the reported mixtures contain any water. Only two mixtures contain exempt compounds. Both of these mixtures contain about ten percent exempt compounds by weight. The non-resin portion of the solids is composed of pigment and other solids.

The proposed VOC limit of 540 g/l is technologically and commercially feasible by the January 1, 2009, effective date based on data provided by the coating manufacturers. Five companies reported uniform finish coatings in the 2002 Survey. Three companies reported complete and valid information and two of the companies have coatings that meet the proposed limit.

12. Any Other Coating Type

This category is for any coating that does not fit into the specified coating categories. It was created so that if such a coating existed it would not be exempt from the VOC content limits. Currently, we are unaware of any coating that would be in this category. The proposed VOC limit of 250 g/l was set to preserve the emission reductions from the proposed SCM.

Table IV-3 - Basic Physical Parameters

		Minimum	Maximum	Average
Adhesion Promoter	Volume % Solids	1.1	35.8	14.3
	Weight % Solids	1.0	51.8	20.3
	Weight % Resin	1.0	12.5	3.6
	VOC actual (g/l)	579	857	745
	VOC regulatory (g/l)	579	857	745
Clear Coating	Volume % Solids	2.7	72.3	41.5
	Weight % Solids	3.6	76.5	46.9
	Weight % Resin	3.4	73.9	37.4
	VOC actual (g/l)	29	840	429
	VOC regulatory (g/l)	82	840	464
Color Coating	Volume % Solids	0.7	92.8	25.7
	Weight % Solids	2.7	94.0	34.3
	Weight % Resin	0.8	93.2	29.1
	VOC actual (g/l)	62	883	602
	VOC regulatory (g/l)	63	883	626
Multi-Color Coating	No information was reported.			
Pretreatment Coating	Volume % Solids	2.9	17.8	11.6
	Weight % Solids	3.8	34.0	23.9
	Weight % Resin	1.4	13.9	6.2
	VOC actual (g/l)	579	933	721
	VOC regulatory (g/l)	660	933	736
Primer	Volume % Solids	3.8	85.8	38.8
	Weight % Solids	4.5	84.3	56.5
	Weight % Resin	0.2	56.7	25.4
	VOC actual (g/l)	5	831	477
	VOC regulatory (g/l)	12	831	502
Single-Stage Coating	Volume % Solids	7.6	82.0	33.6
	Weight % Solids	10.0	86.4	41.5
	Weight % Resin	8.2	73.2	28.3
	VOC actual (g/l)	69	797	543
	VOC regulatory (g/l)	87	829	561
Temporary Protective Coating	This information is proprietary.			
Truck Bed Liner	This information is proprietary.			

Table IV-3 - Basic Physical Parameters				
		Minimum	Maximum	Average
Coating				
Underbody Coating	Volume % Solids	24.0	41.4	28.7
	Weight % Solids	31.9	55.0	39.7
	Weight % Resin	15.4	20.0	17.5
	VOC actual (g/l)	25	597	466
	VOC regulatory (g/l)	46	597	469
Uniform Finish Coating	Volume % Solids	2.8	35.7	32.4
	Weight % Solids	3.7	41.0	36.9
	Weight % Resin	3.6	38.3	34.3
	VOC actual (g/l)	464	827	573
	VOC regulatory (g/l)	524	827	584
Any Other Coating Type	No information was reported.			

Table IV-4 - Technical Feasibility		
	Number of Currently Complying Mixtures	Estimated Currently Complying Market Share (percent)
Adhesion Promoter	0	0
Clear Coating	33	8 - 26
Color Coating Systems	8 (6 fleet)	8
Multi-Color Coating	NA	NA
Pretreatment Coating	0	0
Primer	99	40 - 45
Single-Stage Coating Systems	1	NR
Temporary Protective Coating	P	P
Truck Bed Liner Coating	P	P
Underbody Coating	P	P
Uniform Finish Coating	P	P
Any Other Coating Type	NA	NA

NA - Information not available
NR - Volumes not reported
P - Proprietary information

C. SOLVENTS

Solvents, as the term is used in the SCM, are cleaning solutions that contain VOCs. While most districts regulate solvents used for cleaning operations in their automotive coating rules, a couple of districts (e.g., SCAQMD) have separate rules for cleaning solvents. ARB is addressing solvents used in automotive coating cleaning operations as part of the SCM.

Most district rules divide solvents into two categories: surface preparation and cleanup, and application equipment cleaning. These solvent categories typically have different VOC limits, with application equipment cleaning being given a higher VOC limit. Some districts further divide surface preparation solvents into those used to clean plastic parts and all other surface preparation solvents. In these cases, the plastic parts cleaners are given higher VOC limits than the non-plastic parts cleaners. A few districts provide a separate and higher VOC limit for solvents applied from hand-held spray containers. A few districts provide a separate and higher VOC limit for solvents used to clean road tar, engine oil, grease, overspray, and adhesives.

The proposed VOC limit of 25 g/l is technologically and commercially feasible by the January 1, 2009, effective date. The SCAQMD Rule 1171, requires all solvents used for cleaning at automotive coatings operations to meet a 25 g/l VOC limit as of July 1, 2005. There are solvents available that meet the 25 g/l VOC limit through the use of exempt compounds. The SCM would extend the existing SCAQMD limit to the rest of the State.

REFERENCES

California Air Resources Board 2002 Automotive Coatings Survey data.

Code of Federal Regulations Title 40 Part 59 – National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, Sections 59.100 through 59.111 and Table 1 to Subpart B.

Antelope Valley Air Quality Management District Rule 1151 – Motor Vehicle and Mobile Equipment Coating Operations.

Bay Area Air Quality Management District Regulation 8 – Organic Compounds, Rule 45 – Motor Vehicle and Mobile Equipment Coating Operations.

Butte County Air Quality Management District Rule 235 – Requirements for Vehicle and Mobile Equipment Coating Operations.

El Dorado County Air Quality Management District Rule 230 – Automotive Refinishing Operations.

Feather River Air Quality Management District Rule 3.19 – Vehicle and Mobile Equipment Coating Operations.

Glenn County Air Pollution Control District Article IV Prohibitions, Section 105 – Vehicle and Mobile Equipment Coating Operations.

Imperial County Air Pollution Control District Rule 101 – Definitions.

Imperial County Air Pollution Control District Rule 427 – Automotive Refinishing Operations.

Kern County Air Pollution Control District Rule 410.4A – Motor Vehicle and Mobile Equipment Refinishing Operations.

Mojave Desert Air Quality Management District Rule 1116 – Automotive Refinishing Operations.

Placer County Air Pollution Control District Rule 234 – Automotive Refinishing Operations.

Sacramento Metropolitan Air Quality Management District Rule 459 – Automotive, Truck & Heavy Equipment Refinishing Ops.

San Diego County Air Pollution Control District Rule 67.20 – Motor Vehicle and Mobile Equipment Refinishing Operations.

San Joaquin Valley Unified Air Pollution Control District Rule 4602 – Motor Vehicle and Mobile Equipment Coating Operations.

San Luis Obispo County Air Pollution Control District Rule 423 – Motor Vehicle and Mobile Equipment Coating Operations.

Santa Barbara County Air Pollution Control District Rule 339 – Motor Vehicle and Mobile Equipment Coating Operations.

Shasta County Air Quality Management District Rule 3:25 – Vehicle and Mobile Equipment Coating Operations.

South Coast Air Quality Management District Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations.

Tehama County Air Pollution Control District Rule 4:35 – Vehicle and Mobile Equipment Coating Operations.

Ventura County Air Pollution Control District Rule 74.18 – Motor Vehicle and Mobile Equipment Coating Operations.

Yolo-Solano Air Quality Management District Rule 2.26 – Motor Vehicle and Mobile Equipment Coating Operations.

Confidential conversations with paint manufacturers regarding proprietary information related to product development.

V. AMBIENT AIR QUALITY AND EMISSIONS

California's extreme air quality problems require unique strategies for meeting federal and State ambient air quality standards. In this chapter, we provide an overview of these air quality problems and the need for significant emission reductions from all sources of air pollution. We also describe the need for the regulation of automotive coatings and provide a summary of the emissions from the coating categories proposed for regulation.

A. AMBIENT AIR QUALITY AND THE NEED FOR EMISSION REDUCTIONS

VOC emissions contribute to the formation of ozone, and fine particulate matter (PM). PM pollution consists of very small liquid and solid particles in the air. PM includes particles smaller than 10 microns in size (PM_{10}), and particles smaller than 2.5 microns in size ($PM_{2.5}$). 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} and $PM_{2.5}$ pollution result from both direct and indirect emissions. Direct sources of PM_{10} and $PM_{2.5}$ include emissions from fuel combustion and wind erosion of soil. Indirect PM_{10} and $PM_{2.5}$ result from the chemical reaction of VOCs, nitrogen oxides, sulfur oxides and other chemicals in the atmosphere. Federal and State ambient air quality standards for these contaminants have been established to protect California's population from the harmful effects of ozone and PM.

1. 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 amount and reactivity of VOC emissions as well as the amount of NO_x emissions available in the atmosphere (U.S. EPA, 1996; Seinfeld and Pandis, 1998). Ozone is a colorless gas and the chief component of urban smog. It is one of the State's more persistent air quality problems. As shown in Figure V-1, the population-weighted average exposure to ozone concentrations above the 1-hour State ambient air quality standard (of 0.09 ppm) 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.

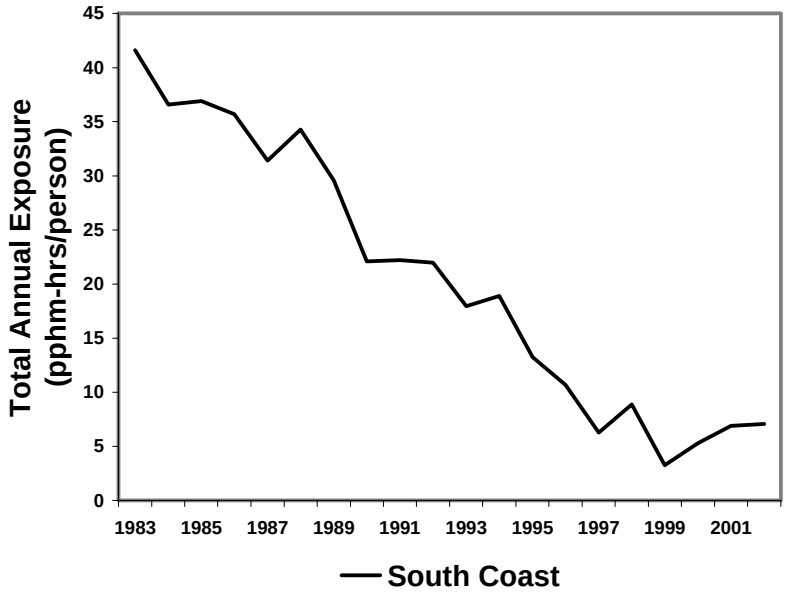
It has been well documented that ozone adversely affects the respiratory functions of humans and animals. Human health studies show that short-term exposure to ozone injures the lung (ARB, 2000b, 1997; U.S. EPA, 1996). In some animal studies, permanent structural changes with long-term exposures to ozone concentrations considerably above ambient levels were noted; these changes remain even after periods of exposure to clean air (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. Ozone is a powerful oxidant that can damage the respiratory tract, causing inflammation and irritation, and induces symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthma symptoms

(U.S. EPA, 1996). Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms.

The greatest risk is to those who are more active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Exposure to levels of ozone above the current ambient air quality standard leads to lung inflammation and lung tissue damage, and a reduction in the amount of air inhaled into the lungs. Recent evidence has, for the first time, linked the onset of asthma to exposure to elevated ozone levels in exercising children (McConnell et al., 2002).

One requirement of The Children's Environmental Health Protection Act is that the ARB, in consultation with OEHHA, review all of California's health-based ambient air quality standards by December 31, 2000 (Senate Bill 25, Escutia, 1999). The purpose of the review was to determine whether the standards adequately protect public health, especially the health of infants and children. The findings are summarized in the report, "Adequacy of California Ambient Air Quality Standards: Children's Environmental Health Protection Act" (ARB, 2000b). This report found that the standards for particulate matter, ozone, and nitrogen dioxide are inadequate to protect public health. The standards for particulate matter (PM_{10} and sulfates) were found to have the highest priority for revision. At the December 9, 2000, Public Meeting, the Board approved the report and urged staff to work as expeditiously as possible to present them with recommendations due to the serious impact of these pollutants on the health of Californians. In March 2005, the State adopted a new 8-hour standard for ozone, and retained the existing 1-hour ozone standard.

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



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, disfiguration or unsatisfactory growth in ornamental vegetation, and damage to native plants. 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 the State'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, 1987). Similarly, the U.S. EPA estimates national agricultural losses to exceed 1 billion dollars annually (U.S. EPA, 1996). Elevated levels of ozone also cause damage to materials such as rubber, paints, fabric, and plastics.

In 1997, the U.S. EPA promulgated a new 8-hour ozone ambient air quality standard (U.S. EPA, 1997). On April 15, 2004, U.S.EPA designated nonattainment areas for the new 8-hour ozone standard effective June 15, 2004 (U.S. EPA, 2004a, 2004b). In California, many of these areas are already designated nonattainment for the federal 1-hour standard. New nonattainment areas include a number of rural Sierra foothill counties and additional parts of the Sacramento Valley. This action starts the transition from the 1-hour standard to the 8-hour standard. The federal 1-hour standard was revoked in June 2005.

SIPs showing how each area will meet the federal 8-hour standard are due by 2007. In order to maintain progress towards clean air, the Clean Air Act prohibits backsliding on the control program. Since the federal 8-hour standard is more health-protective than the federal 1-hour standard, ARB expects that California will need to reduce emissions beyond the existing 1-hour SIP targets. All major urban areas in California continue to violate the federal and State ozone standards, and need additional emission reductions in ozone precursors – such as VOCs – to attain these health-based standards.

2. Fine Particulate Matter

PM is prevalent in the urban atmosphere (see, for example, Pandis *et al.,* 1992), and ambient PM, especially $PM_{2.5}$ is known to have negative impacts on human health (Schwartz *et al.*, 1996; Moolgavkar and Leubeck, 1996). Like ozone, PM can be formed via atmospheric oxidation of organic compounds (Finlayson-Pitts and Pitts, 2000). According to the results from several recent studies, photochemically derived PM (i.e. secondary organic aerosol) could contribute up to 80 percent of the fine particle burden observed in severe air pollution episodes (Pandis *et al.,* 1992; Turpin and Huntzicker, 1991, 1995). In urban PM, these secondary organic aerosols (SOA) could produce effects such as visibility degradation and toxicity (see, for example Atkinson and Arey, 1994).

The relative contribution of primary versus secondary PM also varies by region and by season. While only limited information is available on how much of the measured $PM_{2.5}$ organic carbon component is SOAs, available studies suggest that in the South Coast on an annual average basis, SOAs may constitute six to 16 percent of $PM_{2.5}$. In urban areas of the San Joaquin Valley during the winter, SOAs may contribute up to an average of eight percent of $PM_{2.5}$ (ARB 2005c).

Significant advances have been made in the theoretical and the experimental studies of the formation of SOAs (Pankow, 1994a, 1994b; Odum *et al.,* 1996; Seinfeld and Pandis, 1998; Harner and Bidleman, 1998; Kleindienst, *et al.,*1999; Yu *et al.,* 1999). In addition, modeling techniques to determine the amount of ozone, as well as the amount of aerosol formed from a VOC have been established (Bowman *et al.,* 1995), and the concept similar to maximum incremental reactivity is being applied to quantitatively assess the aerosol formation potential of a VOC (i.e. incremental aerosol reactivity) (Griffin *et al.,* 1999). Based on the results of these studies, we now know that there is a mechanistic linkage between the ozone formation and SOA formation of a VOC.

Although most organic compounds contribute to ozone formation (Carter, 2000), SOA is usually formed from photooxidation of organic compounds with carbon numbers equal to seven or more (Grosjean and Seinfeld, 1989; Wang *et al.,*1992). This observation is consistent with the fact that both reactivity and a product's volatility need to be considered for evaluating the aerosol formation potential of a VOC (Odum *et al.*, 1997). It has also been shown that aromatic compounds are more likely to participate in the formation of SOA than are alkenes (Grosjean, 1992; Pandis *et al.,* 1992). Only chemicals which react fast enough in the atmosphere will generate sufficient amounts of low volatility products for forming aerosols.

The federal and State ambient air quality standards for ozone and PM are shown in Table V-1.

Table V-1 - Ambient Air Quality Standards for Ozone, PM_{10} and $PM_{2.5}$

Pollutant	Averaging Time	State Standard	National Standard
Ozone	1 hour	0.09 ppm (180 $\mu g/m^3$)	----------
	8 hour	0.070 ppm (137 $\mu g/m^3$)	0.08 ppm (157 $\mu g/m^3$)
PM_{10}	24 hour Annual Annual Arithmetic Mean	50 $\mu g/m^3$ 20 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$
$PM_{2.5}$	24 hour Annual Annual Arithmetic Mean	--------- 12 $\mu g/m^3$	65 $\mu g/m^3$ 15 $\mu g/m^3$

The U.S. EPA adopted standards for $PM_{2.5}$ in addition to the PM_{10} standards (U.S. EPA, 1997). $PM_{2.5}$ consists of directly emitted particulate matter, and secondary particulate matter such as nitrates, sulfates and condensables that are formed in the atmosphere from precursors such as NOx, ammonia, SOx and complex hydrocarbons. Because $PM_{2.5}$ is a subset of PM_{10}, these precursors contribute to PM_{10} pollution as well. In 2002, California established an annual average $PM_{2.5}$ standard of 12 $\mu g/m^3$, which is more health-protective than the federal standard (15 $\mu g/m^3$).

U.S. EPA set a February 15, 2004 deadline for states to provide their $PM_{2.5}$ nonattainment designation recommendations based on ambient monitoring data from 2000 through 2002. ARB submitted the data and recommendations on February 11, 2004. (ARB 2004) U.S. EPA finalized the $PM_{2.5}$ designations in January 2005. Nonattainment areas for the federal $PM_{2.5}$ standard include the South Coast Air Basin and the San Joaquin Valley Air Basin. The $PM_{2.5}$ SIPs are due by April 2008.

The vast majority of California's population who live in urban areas breathe unhealthy air. Figures V-2, V-3, and V-4 show that unhealthy levels of ozone, PM_{10}, and $PM_{2.5}$ respectively, are not limited to urban areas, but can be found in nearly every county in California. As shown in these maps for 2004, 46 counties are currently designated as nonattainment (or nonattainment-transitional, which is a subcategory of nonattainment) for the State ozone standard, while 54 counties are designated as nonattainment for the State PM_{10} standard (ARB, 2004). Over 99 percent of California's population lives in areas designated as nonattainment for the State ozone and PM_{10} standards, a clear indication of the magnitude of the air quality problems in California. (ARB, 2005a)

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 SIPs 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 area-wide sources, including consumer products, architectural coatings, and automotive coatings. As emissions from facilities and vehicles are reduced, the area-wide 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 automotive coatings regulations, the inventory for automotive coatings emissions will increase due to population growth.

Figure V-2

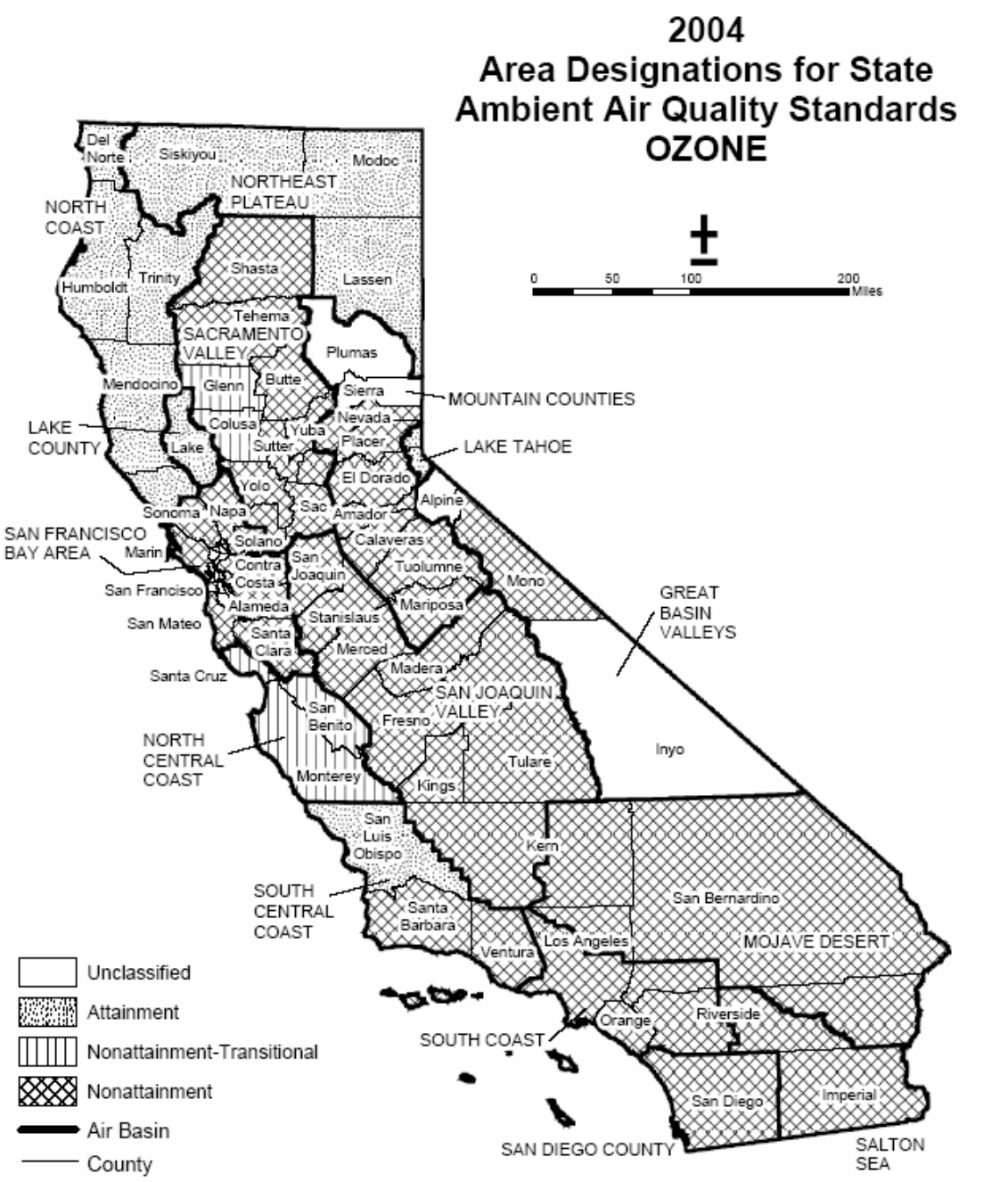

2004
Area Designations for State
Ambient Air Quality Standards
OZONE
0
50
100
200
Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Humboldt
Trinity
Shasta
Lassen
Tehema
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
Nevada
LAKE COUNTY
Colusa
Yuba
Placer
Lake
Sutter
LAKE TAHOE
Yolo
El Dorado
Alpine
Sonoma
Napa
Sac
Amador
SAN FRANCISCO BAY AREA
Solano
Calaveras
Marin
Contra Costa
San Joaquin
Tuolumne
Mono
San Francisco
Alameda
Mariposa
GREAT BASIN VALLEYS
San Mateo
Stanislaus
Santa Clara
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
SOUTH CENTRAL COAST
Santa Barbara
San Bernardino
Los Angeles
MOJAVE DESERT
Ventura
Orange
Riverside
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
SALTON SEA
Unclassified
Attainment
Nonattainment-Transitional
Nonattainment
Air Basin
County

Figure V-3

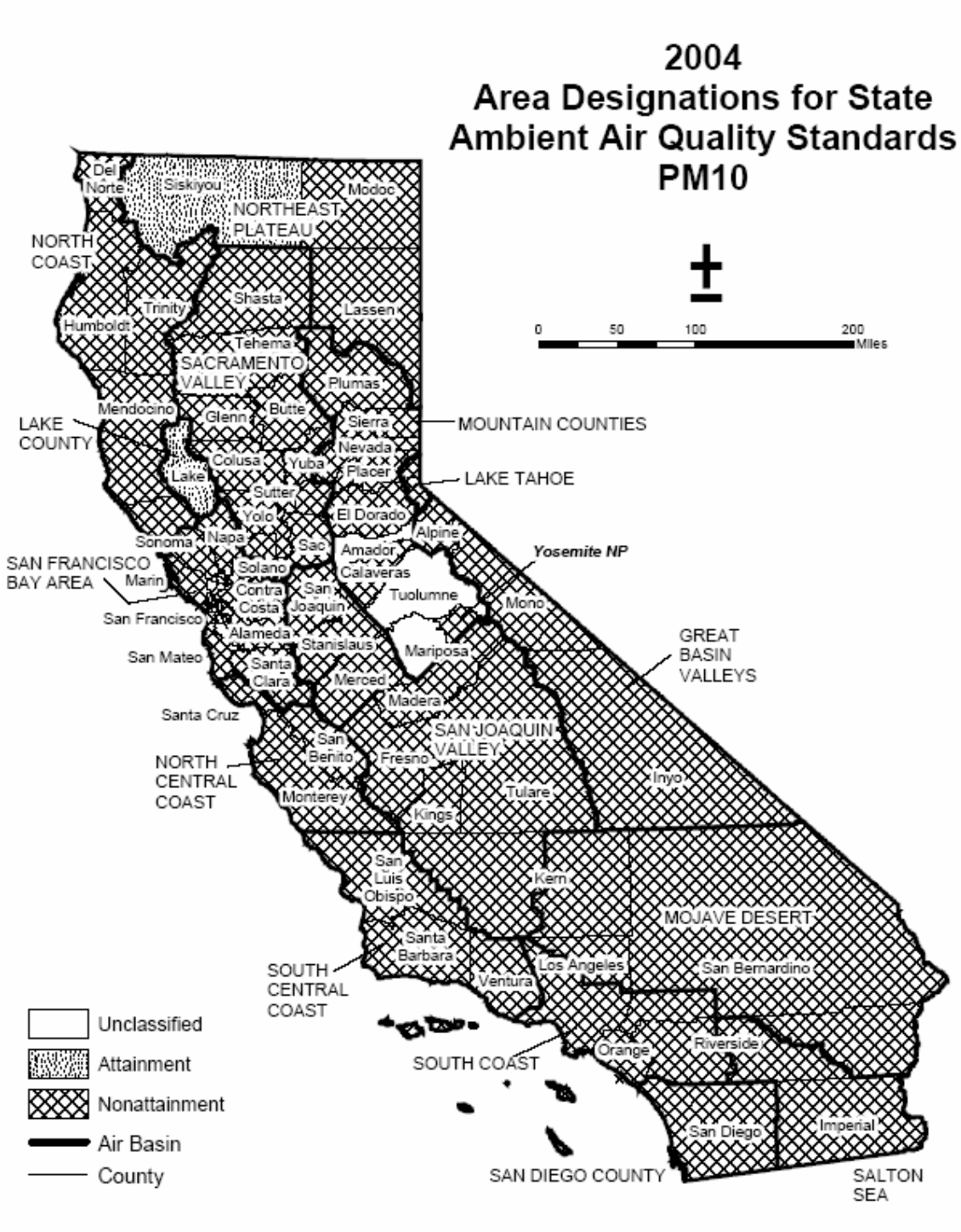
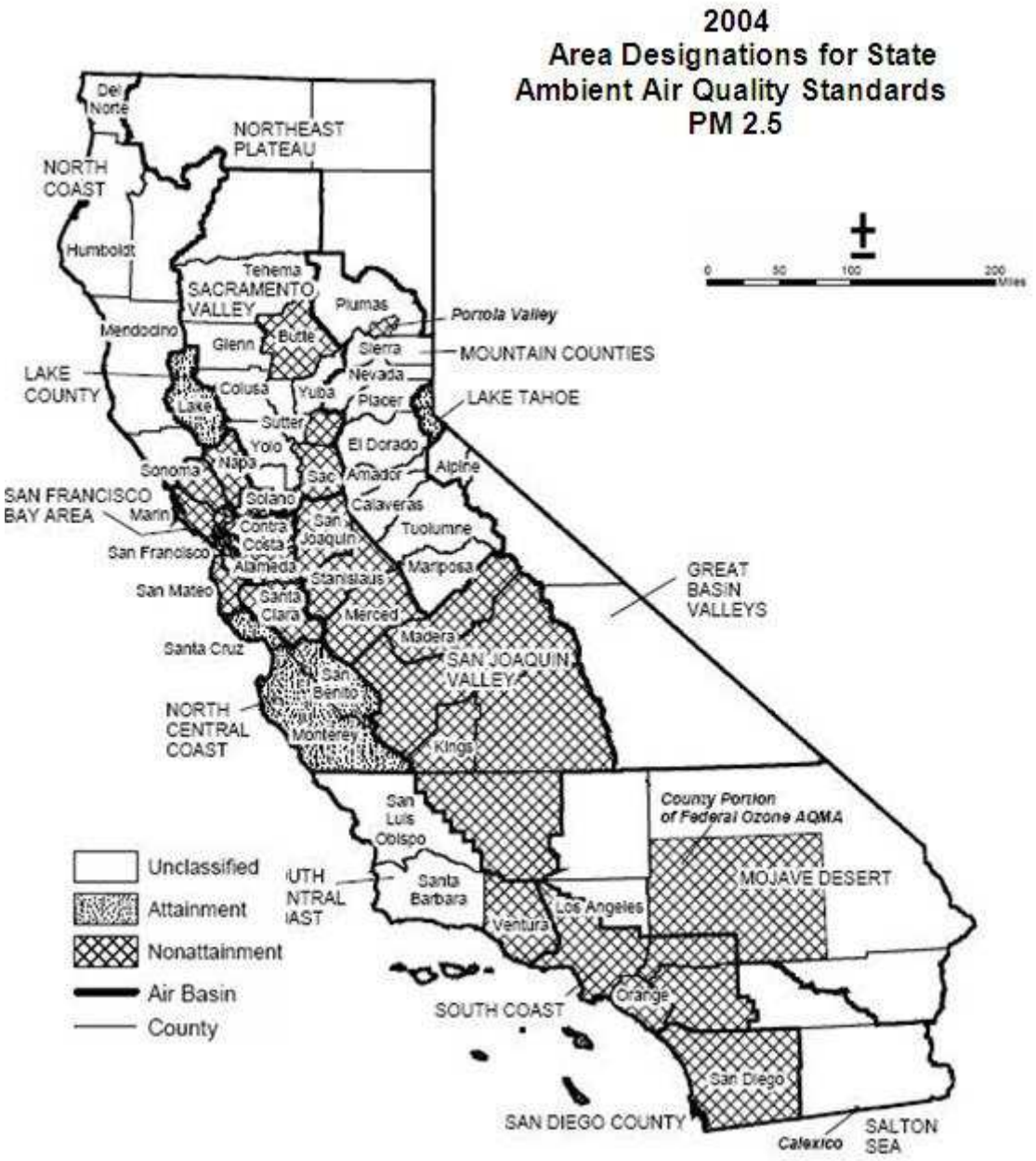

2004
Area Designations for State
Ambient Air Quality Standards
PM10
0
50
100
200
Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Trinity
Shasta
Lassen
Humboldt
Tehema
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
LAKE COUNTY
Nevada
Colusa
Yuba
Placer
LAKE TAHOE
Lake
Sutter
Yolo
El Dorado
Alpine
Sonoma
Napa
Sac
Amador
Yosemite NP
SAN FRANCISCO BAY AREA
Marin
Solano
Calaveras
Contra Costa
San Joaquin
Tuolumne
Mono
San Francisco
Alameda
Stanislaus
Mariposa
GREAT BASIN VALLEYS
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Inyo
Monterey
Tulare
Kings
San Luis Obispo
Kern
MOJAVE DESERT
Santa Barbara
SOUTH CENTRAL COAST
Los Angeles
San Bernardino
Ventura
Orange
Riverside
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
SALTON SEA
Unclassified
Attainment
Nonattainment
Air Basin
County

Figure V-4


2004
Area Designations for State
Ambient Air Quality Standards
PM 2.5
0 50 100 200 Miles
Del Norte
NORTHEAST PLATEAU
NORTH COAST
Humboldt
Tehema
SACRAMENTO VALLEY
Plumas
Portola Valley
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
LAKE COUNTY
Colusa
Nevada
Yuba
Placer
LAKE TAHOE
Lake
Sutter
Yolo
El Dorado
Sonoma
Napa
Sac
Amador
Alpine
SAN FRANCISCO BAY AREA
Marin
Solano
Calaveras
Contra Costa
San Joaquin
Tuolumne
San Francisco
Alameda
Mariposa
GREAT BASIN VALLEYS
San Mateo
Stanislaus
Santa Clara
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
NORTH CENTRAL COAST
Monterey
Kings
San Luis Obispo
County Portion of Federal Ozone AQMA
MOJAVE DESERT
Santa Barbara
Los Angeles
Ventura
Orange
SOUTH COAST
San Diego
SAN DIEGO COUNTY
Calexico
SALTON SEA
Unclassified
Attainment
Nonattainment
Air Basin
County

B. ESTIMATED EMISSIONS FROM AUTOMOTIVE COATINGS

Emissions from automotive coatings are estimated from the survey of automotive coatings that the ARB conducted in 2002. In June 2002, the ARB mailed survey questionnaires to companies that potentially sold automotive coatings products in California in 2001. A total of 17 companies submitted data. The survey collected data on the VOC contents of products, which were then used to estimate VOC emissions from automotive coatings. Estimated emissions from automotive coatings were 7,631 tons per year or approximately 20.7 tpd in 2001, based on the survey data. These quantities do not include emissions from solvents used for surface preparation and cleanup because the 2002 Survey did not collect this data. Table V-2 summarizes key findings from the 2002 Survey data.

The survey also collected information on speciation of VOCs. The quantity of VOC ingredients reported in the survey is close to the quantity of VOC emissions calculated using sales and VOC content data. This indicates a good correlation between the speciated ingredient data and the data that are used to calculate VOC emissions.

Table V-2 - Summary of the 2002 Automotive Coatings Survey	
Total volume (gallons)	3,685,636
Volume of water-based/solvent-based coatings (percent)	1/99
Estimated emissions (tpd)	20.7
Volume per capita (gallons)	0.11
Emissions per capita (pounds)	0.44

Total VOC emissions from stationary sources (including area-wide sources) in California were estimated to be about 1,336 tpd in 2001. VOC emissions from automotive coatings are estimated to be about 20.7 tpd based on ARB 2002 Survey data (ARB, 2005b). This represents about two percent of the VOC emissions from stationary sources.

Table V-3 presents the estimated emissions and emission reductions by category based on the coating information provided in the 2002 Survey. The emissions estimate accounts for the total volume of products sold. Because the 2002 Survey did not collect data on solvent usage for surface preparation and cleanup, we are unable to quantify the emission reduction from the 25 g/l VOC limit for solvents. However, the emission reduction from the 25 g/l VOC limit has already been accounted for in the SCAQMD under Rule 1171. Although not quantified, extending the 25 g/l VOC limit for solvents statewide would achieve emission reductions outside of the SCAQMD.

Table V-3 - Estimated Emissions and Emission Reductions from Automotive Coatings			
	Estimated Emission Baseline (tpd)	**Estimated Emission Reductions (tpd)**	**Percent Reduction**
Adhesion Promoter	0.03	0.02	78
Clear Coating	2.70	1.61	60
Color Coating	12.85	8.78	68
Multi-color Coating	0.00	0.00	0
Pretreatment Coating	0.36	0.21	59
Primer	1.78	1.01	56
Single-stage Coating	2.87	1.68	58
Temporary Protective Coating	<0.01	<0.01	43
Truck Bed Liner Coating	<0.01	<0.01	0
Underbody Coating	0.01	<0.01	53
Uniform Finish Coating	0.08	0.05	63
Any Other Coating Type	0.00	0.00	0
Total	**20.7**	**13.4**	**65**

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VI. ENVIRONMENTAL IMPACTS

Both the California Environmental Quality Act (CEQA) and ARB policy require the ARB to evaluate the potential adverse environmental impacts of proposed projects. The intent of the proposed SCM is to protect the public health by reducing the public's exposure to potentially harmful emissions of VOCs. An additional consideration is the impact that the proposed SCM may have on the environment. Based on available information, the ARB has determined that no significant adverse environmental impacts should occur as a result of districts adopting the proposed SCM. This chapter summarizes the potential impacts that the proposed SCM may have on wastewater treatment, air quality, and hazardous waste disposal.

A. ANALYSIS OF REASONABLY FORESEEABLE ENVIRONMENTAL IMPACTS OF THE METHODS OF COMPLIANCE

1. Potential Wastewater Impacts

Wastewater is regulated in California by the Water Resources Control Board. In California, wastewater containing hazardous substances is not allowed to be disposed of in the sewer system. Discharge of wastewater from automotive coatings facilities to a sanitary sewer can result in the solids portion of the coating accumulating in sewage treatment sludge, preventing its beneficial use. Some contaminants "pass through" and are discharged to lakes, rivers, bays, and oceans. Although the practice is illegal, facility operators may introduce hazardous substances to the sewer system by washing down areas containing over spray and allowing that water to enter the sewer system.

Most waste paint is a result of over spray and is collected primarily on the paint booth exhaust filter or in floor sweepings. Coating facilities may also generate paint-contaminated disposable rags, masking tape and paper, disposable mixing cups and sticks, and disposable paint strainers. The dry paint related wastes are typically landfilled. The reduction of VOC content will reduce the amount of VOCs landfilled.

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 PCBTF) 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 color coatings are already using water-based technology, no additional water quality impacts from future compliant water-based coatings are expected, although use of water-based coatings is expected to increase. The current manufacturing and clean-up practices associated with water-based 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 adverse water quality impacts.

Tertiary-Butyl acetate ($CH_3COOC(CH_3)_3$) is the common name for acetic acid, 1,1-dimethylethyl ester. Other names include *t*-butyl acetate, *tert*-butyl acetate, and informally, TBAC or TBAc™. It is an effective viscosity reducer with an intermediate flash point and vapor pressure. Industrially, it can be used in a variety of coatings. ARB staff has recommended that the districts consider exempting TBAC from their VOC definitions. It is anticipated that this exemption will be granted, by some if not all districts, allowing TBAC to be substituted for non-exempt VOCs of higher reactivity when reformulating automotive coatings and potentially cleaning solvents. In ARB's Draft Environmental Impact Assessment of *Tertiary*-Butyl Acetate (ARB, 2005), the staff determined that in automotive coating products, the compounds most likely to be replaced by TBAC are xylenes, toluene, and methyl ethyl ketone (MEK). (see http://www.arb.ca.gov/research/reactivity/tbac1.pdf)

ARB's assessment of TBAC also examined the potential impact on water of an increased use of TBAC. Based on information provided by the Lyondell Chemical Company and a literature search, the potential risk to surface waters of California is expected to be low, assuming the material is stored, used, and disposed of in accordance with hazardous materials regulations.

2. Air Quality Impacts

There are two basic kinds of air emissions from activities conducted at automotive refinishing facilities: VOCs and particulates (solids). Particulates make up the solid part of the paint that contains the binder, pigment, and other additives. To control particulates, painting should be performed inside a paint spray booth equipped with paint arrestors (filters) and a ventilation system sufficient to draw the air from the booth through the filters. Paint booth air emissions controls are limited to collection of paint particulates. Generally, no control of VOCs from the air exhausted from the paint booth is required or practiced.

The adoption and implementation of the proposed SCM on a statewide basis is expected to produce substantial, long-term, VOC emission reductions. 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 (TAC) Control Program. If the proposed VOC content limits in the SCM were implemented statewide, emissions would be reduced by approximately 13 tons per day beginning in 2009, a net air quality benefit.

Based on ARB's 2002 Survey, xylenes, toluene, and MEK account for approximately 27.5 percent of the VOCs used in automotive coatings. As previously mentioned, ARB's Draft Environmental Impact Assessment of *Tertiary*-Butyl Acetate indicates that these compounds are the most likely VOCs to be replaced by the use of TBAC. Assuming a replacement of 25 to 50 percent of these three VOCs, TBAC substitution would result in a potential use of TBAC of 1.4 to 2.9 tpd. However, color coatings account for about 63 percent of the total VOC emissions and about 50 percent of the

xylenes, toluene, and MEK emissions from automotive coatings. If, as expected, coating manufacturers choose to meet the VOC limit for color coatings with water-borne coatings, the potential emissions of TBAC would be reduced to about 1.5 tpd (assuming 50 percent substitution for xylenes, toluene and MEK).

The California Department of Industrial Relations, Division of Occupational Safety and Health Administration (Cal/OSHA) regulates the concentration of many TACs in the workplace environment. To protect worker safety, Cal/OSHA has established a permissible exposure limit (PEL) for many of these compounds (the PEL is the maximum, 8-hour, time-weighted average concentration for occupational exposure). The current Cal/OSHA PEL for TBAC is 200 ppm for an 8 hour time-weighted average. If TBAC is substituted for xylenes, toluene, and MEK, the worker's TBAC exposure would not be expected to exceed the current workplace exposure standard.

Workers in the automotive coatings industry are exposed to isocyanates, found in polyurethane sealers and some primers. Paper masks offer no protection against isocyanate exposure, only the most protective respirators should be used for situations involving exposures to isocyanates that have poor warning properties, are potent sensitizers, or may be carcinogenic. These respirators include:

- any self-contained breathing apparatus with a full face piece operated in a pressure-demand or other positive-pressure mode, and
- any supplied-air respirator with a full face piece 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.

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.

Some manufacturers and districts have expressed a concern over the possible increased worker exposure to glycol ethers and TBAC upon reformulation to lower VOC automotive coatings and cleaning solvents. Because of the history of isocyanate

exposure in the automotive refinish industry, available personal protection systems are sufficient to protect against worker exposure to glycol ethers and TBAC.

In ARB's Draft Environmental Impact Assessment of *Tertiary*-Butyl Acetate, it is estimated that a large body shop uses 3,000 gallons of automotive coatings per year, and assumes that the average amount of toluene, xylenes and MEK present in automotive coatings is 50 percent of the total VOC content of the coating. Under this worst-case scenario, a large automotive refinishing facility would emit more than 6,500 pounds per year of TBAC if TBAC was substituted for toluene, xylenes, and MEK on a one-for-one basis. However, the SCAQMD has recently indicated that the largest automotive refinishing facility in their district uses no more than 1,100 gallons of coatings per year. Based on ARB's 2002 Automotive Survey, xylenes, toluene, and MEK account for approximately 27.5 percent of the VOCs used in automotive coatings. Under this scenario, which we believe most accurately defines the worst-case scenario for a large automotive refinishing facility, the amount of TBAC emitted annually would be approximately 1,350 pounds if TBAC was substituted on a one-for-one basis for toluene, xylenes and MEK.

The TBAC analysis also assesses the potential cancer risk from TBAC emissions from automotive refinishing facilities. The highest estimated cancer risk for a facility emitting 2,692 pounds per year of TBAC was 11 excess lifetime cancer cases per million. Based on the updated emission estimate for a large facility and the substitution assumption of 50 percent, we estimate the maximum potential risk to be 2.8 excess lifetime cancer cases per million. However, if the VOC limit for color coatings is met with water-borne coatings, the potential cancer risk would be reduced to about 1.4 in a million.

Staff also analyzed the potential for other air quality impacts. During past regulatory efforts affecting coatings, industry representatives have alleged that the use of low VOC coatings may create certain significant adverse air quality impacts. While similar concerns have not been raised during the development of this SCM, we examined the following issues in order to determine if any of these concerns were applicable to automotive coatings:

- *Will the use of lower VOC automotive coatings result in a thicker film coating?*

  No. In previous rulemakings on coatings, some industry representatives contended that lower VOC coatings are formulated with high solids contents and were therefore difficult to handle during application, tending to produce a thick film when applied. A thicker film supposedly indicates that a smaller surface area is covered with a given amount of material, thereby increasing VOC emissions per unit area covered as compared to higher VOC coatings. Although high solids, low VOC coatings are being used, the recommended film thickness for these coatings is similar to that for higher VOC coatings. Thus, a lower VOC coating would cover the same or larger surface area than a higher VOC coating.

- *Will the use of lower VOC automotive coatings result in illegal thinning of the product?*

Excessive thinning is not expected to be a problem because many of the coatings already comply with the SCM limits. Additionally, the VOC limit for color coatings is expected to be met with the use of water-borne formulations. Even if some thinning occurs, thinning would likely be done with water or exempt solvents. As a result, the potential for excessive thinning is minor and concerns about significant adverse air quality impacts are unfounded.

- *Will the use of lower VOC automotive coatings require additional priming for proper adhesion to the substrate?*

No. Automotive coatings primers are currently solvent-borne coatings, and many already meet the VOC limits in the proposed SCM. Manufacturers' data show that substrate preparation for low VOC color coatings is similar to substrate preparation for higher VOC color coatings. No instances of poor adhesion between primers and low VOC color coatings are expected.

- *Will the use of lower VOC automotive coatings require the use of more topcoats?*

In previous rulemakings on coatings, some industry representatives have claimed that the proposed lower VOC limits would yield products that provide inferior coverage, resulting in the use of more coatings to provide the same coverage as their higher VOC counterparts. This is not the case with automotive coatings. In fact, some low VOC water-borne automotive coatings currently sold and used in the United States provide greater coverage than solvent-borne automotive coatings. Manufacturers and current users of water-borne automotive coatings have indicated that coverage is superior to that of solvent-borne coatings, and therefore do not require the application of additional coats to achieve the necessary coverage.

- *Will the use of lower VOC automotive coatings require more frequent recoating?*

No. Water-borne automotive coatings have been used successfully by the majority of the automobile manufacturers for several years; they are also used in manufacturer's vehicle processing centers, where cars are touched up prior to distribution in the United States. Data from the automotive coatings sector do not support the claim that lower VOC automotive coatings require more frequent recoating.

- *Will the use of lower VOC automotive coatings result in product substitution by the end-users?*

There are currently available low VOC automotive coatings with performance characteristics comparable to higher VOC automotive coatings, therefore it is not anticipated that spray technicians will substitute a product from a higher VOC category. Typically, manufacturers market coatings as a system and will not warranty the products' performance if the user deviates from the recommended usage. Additionally, the products within each automotive coatings category are specific to certain applications, and do not lend themselves to use in another coating category.

- *Will the use of lower VOC automotive coatings result in coatings with higher reactivity?*

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, 1999). For example, using the MIR scale as a basis, a typical VOC used in water-borne coatings, such as propylene glycol, is two to three times more reactive than a typical mineral spirits. However, less reactive solvents such as mineral spirits are not extensively used in automotive coatings. Automotive coatings tend to have solvents with higher reactivity such as xylenes and toluene. The reactivity of propylene glycol is approximately one-third the reactivity, on a gram for gram basis, of xylenes and toluene. Additionally, it is anticipated that manufacturers will incorporate the use of water and exempt solvents when formulating to meet the lower VOC limits of the proposed SCM. We have concluded, based on this information, that the total reactivity of the lower VOC automotive coatings will be less than the reactivity of the higher VOC automotive coatings.

3. Potential Hazardous Waste Impacts

The Department of Toxic Substances Control (DTSC) is the lead agency in California for hazardous waste management. DTSC enforces the California's Hazardous Waste Control laws, issues permits to hazardous waste facilities, and mitigates contaminated hazardous waste sites. In California, all hazardous waste must be disposed of at a facility that is registered with DTSC. Under these programs, automotive coatings may be classified as hazardous waste if they contain substances listed as toxic or if they meet other hazard criteria.

Many counties in California operate a Small Business Waste Program, providing low-cost programs for small businesses that qualify as Conditionally Exempt Small Quantity Generators (CESQG). In order to qualify as a CESQG, as defined in the California Health and Safety Code, section 25218.1, and the Code of Federal Regulations (40

CFR 261.5), the business must generate no more than 100 kilograms (220 pounds or approximately 27 gallons) of hazardous waste, or one kilogram (2.2 pounds) of extremely hazardous waste. The small business considered a CESQG must also store less than 2,200 pounds of all kinds of hazardous waste at any time. In order to encourage businesses to participate in their programs, many cities help subsidize disposal costs. Often times the disposal costs are tax deductible and the long-term liability of the materials is taken over by the county or city agency.

It is difficult to determine the amount of liquid waste paint generated from automotive coatings since the waste paint is usually mixed with waste paint thinner. Waste paint thinner is usually generated when paint guns and other paint equipment are cleaned. The waste paint thinner is usually collected in a 55 gallon drum and is mixed with waste paint. In almost all cases, waste coatings in liquid form must be managed as hazardous waste. The reduction of solvents in automotive coatings is not expected to result in non-hazardous liquid waste coatings. Solvent-based automotive coatings waste will still be classified as hazardous due to ignitability characteristics.

It is anticipated that resin manufacturers and coatings formulators will continue the trend of using less hazardous solvents such as Oxsol 100, and propylene glycol in their compliant coatings. It is expected that future compliant coatings will contain less hazardous materials, or nonhazardous materials, as compared to conventional coatings, resulting in a net benefit. Therefore, hazard impacts associated with the proposed SCM will be negligible.

Coating facilities that have filter-type paint booths also generate paint booth exhaust filters. Paint booth exhaust filters are changed every few weeks to few months depending on the amount of painting being done. Waste paint filters need to be tested for ignitability and toxicity characteristics. The *"Toxicity Characteristic Leaching Procedure"* (TCLP) is used to determine if the filters contain toxic materials. It is rare that a paint booth filter will meet the definition of hazardous waste assuming that only typical automotive coatings have been used. Waste filters are typically thrown into the trash for disposal at the sanitary landfill. It is not anticipated that the proposed SCM will impact the quantity or toxicity of the paint booth exhaust filters currently being landfilled.

4. Reasonably Foreseeable Feasible Mitigation Measures

ARB is required to do an analysis of reasonably foreseeable mitigation measures. We have concluded that no significant adverse environmental impacts should occur from implementation of the proposed SCM. As a result, no mitigation measures would be necessary.

5. Alternatives to the Proposed SCM

As alternatives to the proposed SCM, ARB staff evaluated taking no action and delaying the effective date. ARB staff determined that neither of these alternatives would be as effective at reducing VOC emissions from automotive coatings activities as the proposed SCM. The no action alternative was rejected because it would not achieve emission reductions necessary to attain the State and federal ambient air quality standards. The delayed effective date alternative was rejected because compliant coatings are currently available or will be available before the proposed effective date of January 1, 2009.

B. COMMUNITY HEALTH AND ENVIRONMENTAL JUSTICE

The ARB is committed to evaluating community impacts of proposed regulations, including environmental justice concerns. ARB's goal is to reduce or eliminate any disproportionate impacts of air pollution on low-income and minority populations so that all individuals in California can live, work, and play in a healthful environment. The proposed SCM is not expected to result in significant negative impacts in any community. The result of the proposed SCM will be reduced exposure to VOCs and toxic air contaminants (e.g., xylenes, toluene, and MEK) for California communities, including those with large populations of low-income and minority residents.

As part of our Community Health and Environmental Justice Programs, we assess and reduce the localized impacts of pollution from multiple sources. The cumulative, multi-pollutant focus of this important program compels us to take a more comprehensive, integrated approach to defining the ARB's overall control strategy.

Many communities in California are composed of a mix of residential, commercial, and industrial sites. During and after World War II, these areas experienced tremendous development due to rapid population growth and capital investment in military and industrial complexes. This rapid growth and development did not allow for proper residential planning, therefore, residential areas and industrial zones may be integrated. As a result, parts of these communities exhibit an unhealthy mixture of homes, schools, and environmentally hazardous facilities. Homes within these neighborhoods may be in close proximity to multiple sources of air pollution, such as businesses, industries, storage facilities, and freeways.

Automotive refinishing facilities, whose operations produce VOCs, are often among those types of small businesses located in low-income, minority communities. The higher than average incidence of asthma and other respiratory illnesses in children living in these communities may be related to poor air quality (U.S. EPA, 2000).

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United States Environmental Protection Agency Region 9. *Fact Sheet: Barrio Logan Environmental Justice Project* News Release 11/13/2000. (U.S. EPA 2000)

VII. ECONOMIC IMPACTS

A. INTRODUCTION

This chapter discusses the economic impacts ARB staff anticipates from statewide implementation of the SCM. In general, economic impact analyses are inherently imprecise, especially given the unpredictable behavior of companies in a highly competitive market. While we quantified the economic impacts to the extent feasible, some projections are necessarily qualitative or semi-quantitative and based on general observations about the automotive refinishing industry. This analysis, therefore, serves to provide a general picture of the economic impacts that typical businesses subject to the proposed SCM might encounter; we recognize that individual companies within each district may experience impacts different than those projected in this analysis.

The overall projected impacts are summarized first, followed by a detailed discussion of specific aspects of the economic impacts in the sections listed below:

B) Annual Costs and the Cost-Effectiveness of the Proposed SCM;
C) Economic Impacts on California Businesses;
D) Potential Impacts on California State or Local Agencies; and
E) Potential Impacts on California Consumers.

It is important to note that ARB staff conducted the economic impacts analysis, even though the analysis is not required under the Administrative Procedure Act for a SCM, such as the staff's proposal. The analysis uses virtually the same methodology adopted by the Board in approving the 2000 Architectural Coatings SCM (ARB, 2000) and consumer product rulemakings since 1990 (ARB; 1990; ARB, 1991; ARB, 1997; ARB, 1999).

1. Summary of Economic Impact

Our analysis shows that the cost-effectiveness of the proposed limits is similar to the cost-effectiveness of the existing consumer product regulations (Phase I-II and Mid-Term Measures I-II), as well as other existing ARB regulatory programs. We estimate the overall cost-effectiveness of the proposed SCM to be $1.43 per pound of VOC reduced in current dollars. This cost-effectiveness is comparable in magnitude to that reported for other ARB consumer product regulations and measures, which generally have fallen within a range of no cost to about $6.90 per pound of VOC reduced. The architectural coatings SCM had an average cost-effectiveness of $3.20 per pound of VOC reduced.

In this analysis, we considered the impact to manufacturers of automotive coatings and automotive refinishing facilities. Overall, most automotive refinishing facilities and coatings manufacturers would be able to absorb the cost of the proposed SCM with no

significant adverse impacts on their profitability. This finding is indicated by the staff's estimated change in "return on owner's equity" (ROE) analysis. The analysis found an average decrease in ROE of about 0.07 percent for coating manufacturers, and 15 percent for automotive refinishing facilities. If all costs of the proposed SCM are absorbed by automotive refinishing facilities, the decrease in ROE exceeds the 10 percent threshold typically used to indicate a potential for adverse impacts on profitability. However, we expect the costs incurred by manufacturers and automotive refinishing facilities to be passed on to consumers. If the entire cost of the proposed SCM were passed on to consumers, the average price for a repair would increase by about $11, which represents an increase of about 0.5% for a $2,200 repair. Because we expect most businesses to pass on their costs to consumers, we do not expect a noticeable change in employment; business creation, elimination or expansion; and business competitiveness in California. We also found no significant adverse fiscal impacts on any local or State agencies.

To project the maximum potential impacts on consumers, we assume the opposite scenario relative to the business impacts analysis. That is, rather than determining whether businesses can absorb all costs incurred and not have a significant impact on their profitability, we assume for the consumer impacts analysis that coating manufacturers and automotive refinishing facilities are able to pass on all the costs to the consumers by raising the price of refinishing a vehicle. If the cost were passed on to consumers, most of the impact would probably be in the form of increased insurance premiums. For the purpose of this analysis, we assume that only consumers who have their vehicle repaired or refinished are impacted. With this assumption, we project an average cost increase of about $11 per vehicle repaired or refinished.

2. General Approach for Cost Estimation

The economic impacts analysis consists of several parts. First, we calculated the total annual costs of the proposal. An analysis was conducted to determine the impacts on the annual costs to manufacturers based on raw material costs of typical complying and noncomplying coatings. In addition, we estimated the cost to market and distribute coatings that comply with the limits of the proposed SCM based on discussions with manufacturers. Because the 2002 Survey did not collect data on cleaning solvents, the analysis does not include the potential costs of complying with the proposed VOC limit for solvents. However, solvent manufacturers marketing in the SCAQMD already incurred the costs to develop 25 g/l cleaning solvents because the limit is already in effect the SCAQMD. We then estimated the annual cost to automotive refinishing facilities to use complying coatings without loss of production. The projected annual costs then become the inputs for determining the three main outputs of the analysis: the cost-effectiveness, the business impacts, and the consumer impacts.

The cost-effectiveness is presented to compare the proposal's cost efficiency in reducing a pound of VOC relative to the cost-efficiency of other rules and control measures adopted by the districts and the ARB. The business impact analysis employs two scenarios under which all costs incurred to meet the proposal are absorbed by the

coating manufacturers, and then by assuming that all costs incurred by both the manufacturers and automotive refinishing facilities are absorbed by the automotive refinishing facilities. On the other hand, the consumer impact analysis operates under the hypothetical regime where all costs incurred to meet the proposal are passed on to the consumers in the form of increased cost to refinish a vehicle. These three parts of the analysis represent the boundaries of expected impacts, with the actual regulatory impacts from the proposal probably falling somewhere between these three extremes (i.e., some costs are absorbed by the manufacturer, some costs are absorbed by the automotive refinishing facilities, with the remaining costs passed on to consumers). Thus, the actual business impacts and price increases will likely be less than predicted in this analysis.

Distributors of automotive coatings may also incur some costs if those costs cannot be passed on to the automotive refinishing facilities because of competitive pressures. Potential cost to these operations might include some cost sharing between the manufacturer and distributor to transition customers to new products such as water-borne color coats. Based on discussions with industry representatives, it appears that cost sharing arrangements can vary widely and are not available to all automotive refinishing facilities. Thus, staff is unable to assess the potential impacts to distributors. However, because all coating and solvent manufacturers are subject to the same VOC limits, any impacts to distributors should be similar regardless of what manufacturer's products they market.

3. Sources and Treatment of Cost Data

The cost analysis relied on various sources of information. For cost information specific to manufacturers, we relied on estimates based on discussions with manufacturers of automotive coatings. Most manufacturers already market coatings that would comply with the limits in the SCM, and the estimated cost was primarily based on the cost for all manufacturers to market and distribute those coatings in California (Taylor, 2005). Compliant cleaning solvents are also currently marketed in California.

For industry wide data on automotive refinishing facilities, we relied on the U.S. Census Bureau, industry organizations, the SCAQMD, and information from third party sources. To estimate the cost of equipment, training, and other services automotive refinishing facilities may need to comply with the SCM and maintain sufficient levels of production, we relied on discussions with distributors of automotive coatings, spray booth manufacturers, air movement manufacturers, and automotive refinishing facility operators (US Census, 2005; Henderson, 2005; SCAQMD, 2005; Taylor, 2005; Elders, 2005; Ortiz, 2005; Hagan, 2005; Mac, 2005; Phillips, 2005).

We assumed that operating and maintenance costs for new equipment and waste disposal for water-borne color coatings is five percent of the equipment costs.

B. ANNUAL COSTS AND THE COST-EFFECTIVENESS (C.E.) OF THE PROPOSED SCM

1. Introduction

In the following analysis, we present the anticipated annual costs and cost-effectiveness of the proposed SCM. Determining the proposal's cost-effectiveness allows us to compare the efficiency of the proposed SCM in reducing a pound of VOC relative to other existing regulatory programs. To do this, we applied a well-established methodology for converting compliance costs, both nonrecurring and recurring costs, to an annual basis. We then report the ratio of the annual costs to the annual emission reductions in terms of "dollars (to be) spent per pound of VOC reduced." To put the proposal's cost-effectiveness into proper perspective, we compare the results of our analysis with the cost-effectiveness of other ARB regulations and control measures.

2. Methodology

As noted previously, the cost-effectiveness of a regulation is generally defined as the ratio of total dollars to be spent to comply with the regulation (as an annual cost) to the mass reduction of the pollutant(s) to be achieved by complying with that regulation (in annual pounds). Annual costs include annualized nonrecurring costs (e.g., total research and development (R&D), product and consumer testing, equipment purchases/modifications, one-time distributional/marketing changes, etc.) and annual recurring costs (e.g., increases or decreases in raw material costs, labeling, packaging, recordkeeping & reporting, etc.). Thus, the cost-effectiveness is calculated according to the following general equations:

$$\text{Cost-Effectiveness} = \frac{\text{Annualized Nonrecurring Costs} + \text{Annual Recurring Costs}}{\text{Annual Emission reductions}}$$

where,

Annualized Nonrecurring Costs = CRF x ∑ (Nonrecurring Costs)
Annual Recurring Costs = Raw Material Costs + Non Raw Material Costs

The CRF is calculated as follows:

$$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$$

where,

CRF = Capital Recovery Factor
I = discount interest rate in real terms (assumed to be four percent)
n = project horizon or useful life of equipment

As shown above, we annualized the nonrecurring costs (i.e., one-time fixed costs such as R&D, equipment purchases, etc.) using the Capital Recovery Method, which is the recommended approach under California Environmental Protection Agency (Cal/EPA) guidelines. Using this method, we multiply the estimated total fixed costs to comply with each proposed limit by the Capital Recovery Factor (CRF) to convert these fixed costs into discounted, equal annual payments in current dollars over the selected project horizon (i.e., the projected useful life of the investment) (Cal/EPA, 1996). We then sum the annualized fixed costs with the annual recurring costs and divide that sum by the annual emission reductions to calculate the cost-effectiveness of each limit.

3. Assumptions

There are a number of assumptions made to determine the impact to automotive refinishing facilities. Due to the number and unique needs of automotive refinishing facilities in California, some of these businesses will incur costs which will be different than what we have estimated in this analysis.

In determining the impact to automotive refinishing facilities as a worst case scenario, staff assumed that every facility will need to apply water-borne color coatings. Compliant color coatings may be developed with exempt solvents that would require little modification to existing equipment in automotive refinishing facilities. There are also some automotive refinishing facilities that only use single stage coatings which we expect to remain solvent-borne. We don't expect these facilities to be impacted by the SCM.

Coating manufacturers recommend additional air movement equipment to dry water-borne color coatings quickly. Heating equipment was suggested as an option that would allow automotive refinishing facilities to improve production levels. There are a number of solutions available to automotive refinishing facilities to meet air movement needs. These range from small hand held devices to fully integrated air movement systems. Although each automotive refinishing facility will evaluate the costs and benefits of air movement systems, we assumed that automotive refinishing facilities with high annual revenues will generally install the more expensive upgrades to their spray booths to maintain current production levels. We also assumed that automotive refinishing facilities with low annual revenues will install less expensive equipment to save on overall cost. The specific assumptions are discussed in Appendix C.

ARB staff estimated there are about 4,100 automotive refinishing facilities in California. Staff estimated the average gross annual revenue for an automotive refinishing facility to be about one million dollars (Taylor, 2005).

We assumed that 57 percent of all automotive refinishing facilities have a single spray booth. In the absence of industry wide statistics on the number of spray booths for automotive refinishing facilities in California, we used data from the SCAQMD to estimate the number of facilities with multiple booths (SCAQMD, 2005). Although there may be facilities in all revenue categories that have a single spray booth, staff assumed

that only automotive refinishing facilities with annual revenue of less than one million dollars have a single spray booth. We also assumed that 25 percent of the booths have heating equipment, based on data from the SCAQMD. We assumed that all facilities with greater than $2.5 million annual revenue have heating equipment, and all facilities with less than one million dollars annual revenue have no heating equipment.

ARB staff conducted an analysis of raw material costs to manufacturers based on typical ingredients found in complying and noncomplying coatings. Staff determined that the raw material costs of products that comply with the limits of the proposed SCM are generally less than the raw material costs of products that do not comply with the proposed SCM. To be conservative, staff assumed there would be no cost savings to manufacturers or to automotive refinishing facilities from raw material prices.

We also assumed that some small coating manufacturers would cease to sell products in California. According to the 2002 Automotive Coatings Survey, there were 17 manufacturers that sold automotive coatings in California in 2001. Ten of these manufacturers account for about 98 percent of the total volume of automotive coatings sold in California in 2001. We assume that the remaining seven manufacturers that sell very low volumes of coatings in California will cease to sell their products here due to the cost of complying with the SCM.

We also assumed a project horizon of five years and a real discount rate of four percent throughout the project horizon. The five year project horizon is appropriate because that is the generally accepted project horizon used in cost analyses involving chemical processing industries. In addition, five years is the number of years for a project horizon generally recommended by Cal/EPA when conducting a cost-effectiveness analysis (Cal/EPA, 1996, *supra*). With regard to the discount rate, Cal/EPA recommends two percent plus the current yield for a U.S. Treasury note of similar maturity to the project horizon (*Id.*), which in recent years has been about four percent (CNN, 2005). We also assumed a two percent inflation rate.

4. Results

The cost-effectiveness of the SCM is estimated to be $1.43 per pound of VOC reduced, which compares favorably with the cost-effectiveness of measures such as the 2000 Architectural Coatings SCM ($3.20 per pound of VOC reduced). The average annual cost to automotive coating and solvent manufacturers is estimated to be about $320,000. The average annual cost to automotive refinishing facilities is estimated to be about $3,400. The total annualized cost to comply with the proposed SCM is estimated to be about $14 million.

C. ECONOMIC IMPACTS ON CALIFORNIA BUSINESSES

1. Legal Requirements

ARB staff conducted an economic impacts assessment although it is not legally required for the proposed SCM. Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination or creation, and the ability of California business to compete with businesses in other states. Because the staff's proposal is a SCM rather than an administrative regulation, the business impacts assessment is not required. However, ARB staff conducted the normally required business impacts assessment to provide the Board and districts a comprehensive evaluation of the potential cost impacts. Similarly, we also evaluated the SCM's potential impacts to State and local agencies. Normally, State agencies are required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any nondiscretionary cost or savings to local agencies and the cost or savings in federal funding to the State. A major regulation is defined as a regulation that will have a potential cost to California business enterprises in an amount exceeding ten million dollars in any single year.

2. Potential Impact on California Businesses

Only one company, Ellis Paint, currently manufactures automotive coatings in the State. The impact on this company is expected to be minimal since they have coatings that meet the proposed limits in most categories. Additionally, Ellis Paint does not produce color coatings, which will require the most reformulation under the proposed SCM. Ellis Paint also manufactures cleaning solvents that meet the proposed VOC limit of 25 g/l.

3. Affected Businesses

Any person that uses, supplies, sells, offers for sale, manufactures, distributes, blends, or repackages for sale automotive coatings or associated solvents or performs automotive refinishing would potentially be affected by the proposed SCM. Also, potentially affected are businesses that manufacture air movement or heating equipment for spray booths; or supply resins, exempt solvents, or other ingredients and equipment to these manufacturers or marketers.

The focus of this analysis, however, will be on coating manufacturers and automotive refinishing facilities because these businesses would be directly affected by the proposed SCM. Distributors of automotive coatings may also incur some cost if those costs cannot be passed on to the automotive refinishing facilities because of competitive pressures. However, ARB staff is unable to quantify these impacts. Potential costs to distributors might include some cost sharing between the

manufacturer and distributor to transition automotive refinishing facilities to new products such as water-borne color coatings. Staff does not have data on the extent to which such cost sharing might occur.

Automotive coatings are manufactured or marketed by 17 companies nationwide, of which one is based in California, according to the 2002 Survey. The bulk of the sales volume in California was generated by a few companies; three manufacturers account for 65 percent of the volume, with the remaining 14 companies accounting for the other 35 percent (ARB, 2005). The automotive coating manufacturers marketed about 3.7 million gallons of coatings in California in 2001, of which an estimated one million gallons were compliant and 2.7 million gallons were noncompliant with the proposed SCM (*Id.*).

Staff estimates there are approximately 4,100 automotive refinishing facilities in California. These businesses generated about $2.4 billion in annual revenue in 1997 (U.S. Census, 2005). About half of these facilities have an annual revenue of less than $500,000 per year (Taylor, 2005).

a. Study Approach

Sixteen of the 17 manufacturers of automotive coatings who responded to ARB's 2002 Survey sold coatings in California in 2001 that did not meet the proposed SCM limits. Staff did not have information on the 17th manufacturer to make this determination. In addition, for purposes of determining worse-case potential economic impact, staff assumes that all automotive refinishing facilities in California will need to incur costs to comply with the proposed SCM. This is a conservative estimate because facilities that use only single-stage color coatings would not need to invest in air movement equipment or heat because they would continue to use currently available, compliant solvent-borne coatings. The approach used in evaluating the potential economic impact of the proposed SCM on these businesses is outlined as follows:

1) Compliance cost was estimated for manufacturers and automotive refinishing facilities;
2) Estimated cost was adjusted for federal and State taxes; and
3) The three-year average ROE was calculated for businesses by averaging the median ROEs for 2002 through 2004. Actual financial data were used for coating manufacturers where such data were available publicly. In case of the automotive refinishing facilities, however, actual financial data were not available publicly. Thus, we developed a financial profile of a typical California automotive refinishing facility with an annual revenue of $1 million using the Dun and Bradstreet financial ratios for the industry.

ROE is calculated by dividing the net profit by the net worth. The adjusted cost was then subtracted from the net profit data. The results were used to calculate an adjusted three-year average ROE. The adjusted ROE was then compared with the ROE before the subtraction of the adjusted cost to determine the potential impact on the profitability

of the businesses. A reduction of more than 10 percent in profitability is considered to indicate a potential for significant adverse economic impacts.

The threshold value of 10 percent has been used consistently by the ARB staff to determine impact severity (ARB, 1990; ARB, 1991; ARB, 1995; ARB, 1998). This threshold is consistent with the thresholds used by the U.S. EPA and others.

b. Assumptions

The ROEs before and after the subtraction of the adjusted compliance costs were calculated for a typical business using financial data for 2002 through 2004. The calculations were based on the following assumptions:

1) Selected businesses are representative of affected businesses;
2) All affected businesses were subject to the highest federal and State corporate tax rates of 35 percent and 9.3 percent respectively; and
3) Affected businesses are not able to increase the prices of their products, nor can they lower their costs of doing business through short-term cost-cutting measures.

Given the limitation of available data, staff believes these assumptions are reasonable for most businesses at least in the short run. However, they may not be applicable to all businesses.

c. Results

Table VII-1 shows the estimated change in ROE on affected industry groups.

Table VII-1 Changes in Return on Owner's Equity (ROE) for Typical Businesses in the Automotive Refinishing Industry

SIC Code and Category	Change in ROE
2851 Manufacturing - Paints, Varnishes, Lacquers, Enamels, And Allied Products	0.07 percent
7532 Automotive Repair - Top, Body, and Upholstery Repair facilities and Paint facilities	15 percent

The estimated average decline in profitability of businesses is about 0.07 percent for manufacturers, and about 15 percent for automotive refinishing facilities. If the automotive refinishing facilities absorbed all costs, they would be adversely impacted by the proposed SCM. However, we expect automotive refinishing facilities to pass on the costs of the proposed SCM to consumers. If the entire cost of the proposed SCM were passed on to consumers, the average price for a repair or refinish would increase by about $11, which represents an increase of about 0.5% for a $2,200 repair.

The performance of businesses may differ from year to year. Hence, the average financial data used may not be representative of an average year performance for some businesses. The estimated changes to ROEs may be high because affected

businesses probably would not absorb all of the increase in their costs of doing business. They might be able to either pass some of the cost on to consumers in the form of higher prices, reduce their costs, or do both.

4. Potential Impact on Employment

The paint or body repair facilities (NAICS 811121/SIC 7532) are defined as establishments engaged in repairing or customizing automotive vehicles, such as passenger cars, trucks, and vans, and all trailer bodies and interiors; and/or painting automotive vehicles and trailer bodies. It is estimated that there are 27,665 paid employees involved in the automotive body repair and refinishing services (U.S. Census, 2005).

We expect the proposed SCM to have minimal impact on most employees that do automotive refinishing. While it is possible that some automotive refinishing facilities may experience higher costs than those estimated above, we believe that most will not be impacted adversely if districts adopt the proposed SCM.

Cost impacts on coating manufacturers will be minimal. Most coating manufacturers are global companies and the proposed SCM would have minimal impact on their operations as indicated by the change in ROE. Thus, we do not expect any significant impact in the employment at these companies.

5. Potential Impact on Business Creation, Elimination, or Expansion

The proposed SCM should have no noticeable impact on the status of California businesses. This is because the costs are not expected to impose a significant impact on the profitability of businesses in California. However, some small automotive refinishing facilities with little or no margin of profitability may lack the financial resources to modify their facilities in a timely manner. Should the proposed measures impose a significant hardship on these businesses, temporary relief in the form of a compliance date extension under the local districts' variance provision may be warranted.

While some individual businesses may be affected adversely, the proposed SCM may provide business opportunities for existing California businesses or result in the creation of new businesses. California businesses that produce air movement equipment for spray booths or provide consulting services to affected businesses may benefit from increased industry spending.

6. Potential Impact on Business Competitiveness

The proposed SCM is not expected to have a significant impact on the ability of automotive refinishing facilities in California to compete with businesses from another state. Most automotive refinishing facilities are independent operations that compete for local business within their region and rarely seek business from outside the State.

The proposed SCM should have no significant impact on the ability of California manufacturers of automotive coatings to compete with businesses in other states. Because the proposed measures would apply to all businesses that manufacture or market automotive coatings for sale in California regardless of their location, the staff's proposal should not present any economic disadvantages specific to California businesses. Of the 17 companies involved in manufacturing or marketing of automotive coatings in California, only one company is located in California.

D. POTENTIAL IMPACTS ON CALIFORNIA STATE OR LOCAL AGENCIES

We have identified no State or local agency that would be adversely affected by the proposed SCM. One State agency, the California Department of Transportation, performs touch-up work on their fleet vehicles with single-stage color coatings. Since many single-stage color mixtures already comply with the limits of the proposed SCM, we do not expect them to be adversely affected. Additionally, we expect single-stage color coatings to remain solvent-borne, thus there would not be a need for air movement equipment. There are cleaning solvents already available that meet the proposed VOC limit in the SCM. Thus, the solvent requirement is not expected to have an adverse impact on State or local agencies.

E. POTENTIAL IMPACTS ON CALIFORNIA CONSUMERS

The potential impact of the SCM on consumers depends upon the extent to which affected businesses are able to pass on the increased cost to consumers in terms of higher prices for their services. Given the small impact of the proposed SCM on the profitability of most automotive refinishing facilities, we do not expect a noticeable change in the price of services provided by these businesses. Since most repairs are paid directly by insurance companies, consumers may be impacted by higher insurance premiums. We anticipate the impact, if any, on consumers to be negligible. If the annual cost of the proposed SCM were divided among the total number of repairs in California per year, the average cost of a repair would increase by about $11. This represents a 0.5% increase in cost for a typical repair of $2,200. If the consumer is paying for the refinishing directly, he or she would have to absorb the entire cost.

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Appendix A

Proposed Suggested Control Measure for Automotive Coatings

California Air Resources Board
Proposed Suggested Control Measure for Automotive Coatings

1. Purpose

The purpose of this rule is to limit volatile organic compound (VOC) emissions from coatings and solvents associated with the coating of motor vehicles, mobile equipment, and associated parts and components.

2. Applicability

2.1 Except as provided in section 2.2, this rule is applicable to any person who supplies, sells, offers for sale, manufactures, or distributes any automotive coating or associated solvent for use within the District, as well as any person who uses, applies, or solicits the use or application of any automotive coating or associated solvent within the District.

2.2 This rule does not apply to:

2.2.1 Any automotive coating or associated solvent that is offered for sale, sold, or manufactured for use outside of the District or for shipment to other manufacturers for reformulation or repackaging.

2.2.2 Any aerosol coating product.

2.2.3 Any automotive coating that is sold, supplied, or offered for sale in 0.5 fluid ounce or smaller containers intended to be used by the general public to repair tiny surface imperfections.

2.2.4 Any coating applied to motor vehicles or mobile equipment, or their associated parts and components, during manufacture on an assembly line.

3. Definitions

3.1 “Adhesion promoter” means a coating, which is labeled and formulated to be applied to uncoated plastic surfaces to facilitate bonding of subsequent coatings, and on which, a subsequent coating is applied.

3.2 “Aerosol Coating Product” means 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.

3.3 “Assembly Line” means an arrangement of industrial equipment and workers in which the product passes from one specialized operation to another until complete, by either automatic or manual means.

3.4 "Associated Parts and Components" means structures, devices, pieces, modules, sections, assemblies, subassemblies, or elements of motor vehicles or mobile equipment that are designed to be a part of motor vehicles or mobile equipment but which are not attached to motor vehicles or mobile equipment at the time of coating the structure, device, piece, module, section, assembly, subassembly, or element. "Associated parts and components" does not include circuit boards.

3.5 "Automotive Coating" means any coating or coating component used or recommended for use in motor vehicle or mobile equipment refinishing, service, maintenance, repair, restoration, or modification, except metal plating activities. Any reference to automotive refinishing or automotive coating made by a person on the container or in product literature constitutes a recommendation for use in motor vehicle or mobile equipment refinishing.

3.6 "Automotive Coating Component" means any portion of a coating, including, but not limited to, a reducer or thinner, toner, hardener, and additive, which is recommended by any person to distributors or end-users for use in an automotive coating, or which is supplied for or used in an automotive coating. The raw materials used to produce the components are not considered automotive coating components.

3.7 "Automotive Refinishing Facility" means any shop, business, location, or parcel of land where motor vehicles or mobile equipment or their associated parts and components are coated, including autobody collision repair shops. "Automotive Refinishing Facility" does not include the original equipment manufacturing plant where the motor vehicle or mobile equipment is completely assembled.

3.8 "CARB" means the California Air Resources Board.

3.9 "Cleaning Operations" means the removal of loosely held uncured adhesives, inks, coatings, or contaminants, including, but not limited to, dirt, soil, or grease, from motor vehicles, mobile equipment, associated parts and components, substrates, parts, products, tools, machinery, equipment, or general work areas.

3.10 "Clear Coating" means any coating that contains no pigments and is labeled and formulated for application over a color coating or clear coating.

3.11 "Coating" means a material which is applied to a surface and forms a film in order to beautify, preserve, repair, or protect such a surface.

3.12 "Color Coating" means any pigmented coating, excluding adhesion promoters, primers, and multi-color coatings, that requires a subsequent clear coating and which is applied over a primer, adhesion promoter, or color coating. Color coatings include metallic/iridescent color coatings.

3.13 "Electrostatic Spray Application" means any method of spray application of coatings where an electrostatic attraction is created between the part to be coated and the paint particles.

3.14 "Emission Control System" means any combination of capture systems and control devices used to reduce VOC emissions from automotive coating operations.

3.15 "Exempt Compounds" means, for the purposes of this rule, the compounds listed in sections 3.34.1 and 3.34.2.

3.16 "Graphic Arts Operation" means the application of logos, letters, numbers, or graphics to a painted surface by brush, roller, or airbrush.

3.17 "High-Volume, Low-Pressure (HVLP)" means spray equipment permanently labeled as such and which is designed and operated between 0.1 and 10 pounds per square inch, gauge, (psig) air atomizing pressure measured dynamically at the center of the air cap and at the air horns.

3.18 "Metallic/Iridescent Color Coating" means any coating that contains more than 0.042 pounds per gallon (5 grams per liter) of metal or iridescent particles as applied, where such particles are visible in the dried film.

3.19 "Mobile Equipment" means any device that may be drawn and/or driven on rails or a roadway including, but not limited to, trains, railcars, truck trailers, mobile cranes, bulldozers, street cleaners, and implements of husbandry or agriculture.

3.20 "Motor Vehicle" means any self-propelled vehicle, including, but not limited to, cars, trucks, buses, golf carts, vans, motorcycles, tanks, and armored personnel carriers.

3.21 "Multi-Color Coating" means any coating that exhibits more than one color in the dried film after a single application, is packaged in a single container, and hides surface defects on areas of heavy use, and which is applied over a primer or adhesion promoter.

3.22 "Person" shall have the same meaning as defined in Health and Safety Code section 39047.

3.23 "Pretreatment Coating" means any coating that contains a minimum of one-half (0.5) percent acid by weight and not more than 16 percent solids by weight necessary to provide surface etching and is labeled and formulated for application directly to bare metal surfaces to provide corrosion resistance and adhesion.

3.24 "Primer" means any coating, which is labeled and formulated for application to a substrate to provide 1) a bond between the substrate and subsequent coats, 2) corrosion resistance, 3) a smooth substrate surface, or 4) resistance to penetration of subsequent coats, and on which a subsequent coating is applied. Primers may be pigmented.

3.25 "Single-Stage Coating" means any pigmented coating, excluding primers and multi-color coatings, labeled and formulated for application without a subsequent clear coat. Single-stage coatings include single-stage metallic/iridescent coatings.

3.26 "Solvent" means a VOC-containing fluid used to perform cleaning operations.

3.27 "Spot Repair" means repair of an area on a motor vehicle, piece of mobile equipment, or associated parts or components of less than 1 square foot (929 square centimeters).

3.28 "Temporary Protective Coating" means any coating which is labeled and formulated for the purpose of temporarily protecting areas from overspray or mechanical damage.

3.29 "Transfer Efficiency" means the amount of coating solids adhering to the object being coated divided by the total amount of coating solids sprayed, expressed as a percentage.

3.30 "Truck Bed Liner Coating" means any coating, excluding clear, color, multi-color, and single stage coatings, labeled and formulated for application to a truck bed to protect it from surface abrasion.

3.31 "Underbody Coating" means any coating labeled and formulated for application to wheel wells, the inside of door panels or fenders, the underside of a trunk or hood, or the underside of the motor vehicle.

3.32 "Uniform Finish Coating" means any coating labeled and formulated for application to the area around a spot repair for the purpose of blending a repaired area's color or clear coat to match the appearance of an adjacent area's existing coating.

3.33 "U.S. EPA" means the United States Environmental Protection Agency.

3.34 "Volatile Organic Compound (VOC)" means 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:

3.34.1 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

3.34.2 the following low-reactive organic compounds which have been exempted by the U.S. EPA:
acetone;
ethane;
parachlorobenzotrifluoride (1-chloro-4-trifluoromethyl benzene);
perchloroethylene;
methyl acetate; and
tertiary butyl acetate (tBAc).

3.35 VOC Content

3.35.1 "VOC regulatory for Coatings" means VOC in grams per liter of coating, excluding water and exempt compounds, and shall be calculated by the following equation:

$$\text{VOC regulatory content} = \frac{Wv - Ww - Wec}{Vm - Vw - Vec}$$

3.35.2 "VOC actual for Coatings" means VOC in grams per liter of material shall be calculated using the following equation:

$$\text{VOC actual content} = \frac{Wv - Ww - Wec}{Vm}$$

3.35.3 "VOC content for Solvents" means VOC in grams per liter of material shall be calculated by the following equation:

$$\text{VOC content} = \frac{Wv - Ww - Wec}{Vm}$$

Where:

VOC content = amount of volatile organic compounds in grams/liter

Wv = weight of volatiles in grams

Ww = weight of water in grams

Wec = weight of exempt compounds in grams

Vm = volume of material (coating or solvent, as applicable) in liters

Vw = volume of water in liters

Vec = volume of exempt compounds in liters

4. Standards

4.1 **Coating Limits.** No person shall apply to any motor vehicle, mobile equipment, or associated parts and components, any coating with a VOC regulatory content, as calculated pursuant to section 3.35.1, in excess of the following limits, except as provided in section 4.3:

Coating Category	VOC regulatory limit, as applied, effective January 1, 2009 in grams/liter (pounds per gallon*)
Adhesion Promoter	540 (4.5)
Clear Coating	250 (2.1)
Color Coating	420 (3.5)
Multi-Color Coating	680 (5.7)
Pretreatment Coating	660 (5.5)
Primer	250 (2.1)
Single-Stage Coating	340 (2.8)
Temporary Protective Coating	60 (0.5)
Truck Bed Liner Coating	310 (2.6)
Underbody Coating	430 (3.6)
Uniform Finish Coating	540 (4.5)
Any other coating type	250 (2.1)

*English units are provided for information only.

4.2 **Most Restrictive VOC Limit.** If anywhere on the container of any automotive coating, or any label or sticker affixed to the container, or in any sales, advertising, or technical literature supplied by a person, 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 section 4.1, then the lowest VOC content limit shall apply.

4.3 **Alternative Compliance.** Instead of complying with the VOC content limits specified in section 4.1, a person may use an emission control system that has been approved, in writing, by the Executive Officer or Air Pollution Control Officer of the District and which achieves an overall control efficiency of at least 85 percent as determined pursuant to sections 6.5 and 6.6. Any approved system emission control must be maintained and used at all times in proper working condition.

4.4 **Prohibition of Possession.** No person shall possess at any automotive refinishing facility, any automotive coating that is not in compliance with section 4.1 or 4.3, as applicable, or any solvent with a VOC content greater than 25 grams per liter.

4.5 **Prohibition of Sale or Manufacture.** No person shall manufacture, blend, repackage for sale, supply, sell, offer for sale, or distribute within the District any coating with a VOC content in excess of the limits specified in section 4.1.

Notwithstanding the provisions of this section, a person may manufacture, blend, repackage for sale, supply, sell, offer for sale, or distribute a coating with a VOC content in excess of the limits specified in section 4.1 under the following circumstances and provided all of the requirements of section 5.6 are also met:

4.5.1 The coating is for use exclusively within an emission control system as allowed in section 4.3, or

4.5.2 The coating is for use outside the District.

4.6 **Prohibition of Specification.** No person shall solicit or require the use of, or specify the application or use of any coating or solvent on a motor vehicle or mobile equipment, or associated parts and components, if such use or application results in a violation of this rule. This prohibition shall apply to all written or oral contracts, including, but not limited to, job orders, under the terms of which any coating or solvent that is subject to the provisions of this rule is to be used or applied. This prohibition shall not apply to coatings that meet the criteria specified in section 4.5.

4.7 **Coating Application Methods.** No person shall apply any coating to any motor vehicle, mobile equipment, or associated parts and components unless one of the following application methods is used:

4.7.1 Brush, dip, or roller.

4.7.2 Electrostatic spray.

4.7.3 High-Volume Low-Pressure (HVLP) spray equipment.

4.7.4 Use of a spray gun: If a spray gun is used, the end user must demonstrate that the gun meets the HVLP definition in section 3.17 in design and use. A satisfactory demonstration must be based on the manufacturer's published technical material on the design of the gun and by a demonstration of the operation of the gun using an air pressure tip gauge from the manufacturer of the gun.

4.7.5 Any alternative method that achieves a transfer efficiency equivalent to, or higher than, the application methods listed in sections 4.7.1, 4.7.2, or 4.7.3 as determined per section 6.9. Written approval from the Executive Officer or Air Pollution Control Officer of the District shall be obtained for each alternative method prior to use.

section 4.7 does not apply to underbody coatings, graphic arts operations, truck bed liner coatings, or any coating use of less than one (1) fluid ounce (29.6 milliliters).

4.8 Solvent Limits and Evaporative Loss Minimization

4.8.1 Each solvent present at any automotive refinishing facility shall not exceed a VOC content of 25 grams per liter as calculated pursuant to section 3.35.3.

4.8.2 Solvent-laden materials shall be stored in closed containers.

4.8.3 All automotive coating components, automotive coatings, and solvents shall be stored in closed vapor-tight containers.

4.8.4 No person shall clean spray equipment unless a closed system is used. However, equivalent control equipment can be used if the Executive Officer or Air Pollution Control Officer of the District approves it in writing prior to use.

4.8.5 All waste automotive coating components, automotive coatings, and solvents shall be stored in closed vapor-tight containers, except while adding to or removing them from the containers.

5. Administrative Requirements

5.1 Compliance Statement Requirement

5.1.1 For each individual automotive coating or automotive coating component, the manufacturer and repackager shall include the following information on product data sheets, or an equivalent medium:

5.1.1.1 The VOC actual for coatings and VOC regulatory for coatings, expressed in grams per liter;

5.1.1.2 The weight percentage of volatiles, water, and exempt compounds;

5.1.1.3 The volume percentage of water and exempt compounds; and,

5.1.3.4 The density of the material (in grams per liter).

5.1.2 For each individual ready to spray mixture (based on the manufacturer's and repackager's stated mix ratio), the manufacturer and repackager shall include the following information on product data sheets, or an equivalent medium:

5.1.2.1 The VOC actual for coatings and VOC regulatory for coatings, expressed in grams per liter;

5.1.2.2 The weight percentage of volatiles, water, and exempt compounds;

5.1.2.3 The volume percentage of water and exempt compounds; and,

5.1.2.4 The density of the material (in grams per liter).

5.1.3 The manufacturer and repackager of solvents subject to this rule shall include the VOC content as supplied, calculated pursuant to section 3.35.3, expressed in grams per liter, on product data sheets, or an equivalent medium.

5.2 **Labeling Requirements**

5.2.1 The manufacturer and repackager of automotive coatings or automotive coating components shall include on all containers the applicable use category(ies), and the VOC actual for coatings and VOC regulatory for coatings, as supplied, expressed in grams per liter.

5.2.2 The manufacturer and repackager of solvents subject to this rule shall include on all containers the VOC content for solvents, as supplied, expressed in grams per liter.

5.3 **Maintenance of Records.** Records required by this rule shall be retained for a minimum of three years and made available for inspection by District personnel upon request.

5.4 **Record Keeping Requirements.** Any person who uses coatings or solvents subject to this rule shall maintain and have available at all times, on site, the following:

5.4.1 A current list of all coatings and solvents used that are subject to this rule. This list shall include the following information for each coating and solvent:

5.4.1.1 material name and manufacturer

5.4.1.2 application method

5.4.1.3 coating type (as listed in section 4.1) and mix ratio specific to the coating

5.4.1.4 VOC actual for coatings and VOC regulatory for coatings, as applied, or VOC content for solvent.

5.4.1.5 whether the material is a coating or solvent.

5.4.2 Current manufacturer specification sheets, material safety data sheets, technical data sheets, or air quality data sheets, which list the VOC actual for coatings and VOC regulatory for coatings of each ready-to-spray coating (based on the manufacturer's stated mix ratio) and automotive coating components, and VOC content of each solvent.

5.4.3 Purchase records identifying the coating type (as listed in section 4.1), name, and volume of coatings and solvents.

5.5 **Record Keeping Requirements for Emission Control Systems.** Any person using an emission control system shall maintain daily records of key system operating parameters which will demonstrate continuous operation and compliance of the emission control system during periods of VOC emission producing activities. "Key system operating parameters" are those parameters necessary to ensure or document compliance with section 4.3, including, but not limited to, temperatures, pressure drops, and air flow rates.

5.6 **Record Keeping Requirements for Prohibition of Sale.** Any person claiming an exception specified in section 4.5 shall keep a detailed log of each automotive coating component and automotive coating manufactured, blended, repackaged for sale, supplied, sold, offered for sale, or distributed showing:

5.6.1 The quantity manufactured, blended, repackaged for sale, supplied, sold, offered for sale, or distributed, including size and number of containers;

5.6.2 The VOC regulatory for coatings;

5.6.3 The VOC actual for coatings;

5.6.4 To whom they were supplied, sold, offered for sale, or distributed, or for whom they were manufactured, blended, or repackaged for sale including the name, address, phone number, retail tax license number, and valid district permit number; and,

5.6.5 The specific exception being utilized under section 4.5.

6. Test Methods. The following test methods are incorporated by reference herein, and shall be used to test coatings and solvents subject to the provisions of this rule. A source is in violation of this rule if any measurement by any of the listed applicable test methods exceeds the standards of this rule.

6.1 **Methyl Acetate, Acetone, t-Butyl Acetate, and PCBTF Content.** The quantity of methyl acetate, acetone, t-butyl acetate, and parachlorobenzotrifluoride (as specified in sections 3.15, 3.34, and 3.35) shall be determined by using ASTM Method D6133-02: "Standard Test Method for Acetone, *p*-Chlorobenzotrifluoride, Methyl Acetate or *t*-Butyl Acetate Content of Solventborne and Waterborne Paints, Coatings, Resins, and Raw Materials by Direct Injection Into a Gas Chromatograph" (February 2003).

6.2 **Acid Content.** Measurement of acid content (as specified in section 3.23) shall be determined by using ASTM D1613-03 "Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products" (October 2003).

6.3 **Alternative Test Methods.** The use of other test methods which are determined to be equivalent or better and approved, in writing, by the Executive Officer or Air Pollution Control Officer of the District, CARB, and U.S. EPA may be used in place of the test methods specified in this rule.

6.4 **VOC Content of Coatings or Solvents.** VOC content (as specified in sections 3.35, 4.1, and 4.8.1) shall be determined by U.S. EPA Method 24 as set forth in Appendix A of Title 40 of the Code of Federal Regulations (40 CFR) Part 60, "Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings".

6.5 **Control Efficiency.** When either U.S. EPA Method 25, 25A, or 25B is used to determine VOC emissions, control device equivalency (as specified in section 4.3) shall be determined as specified in U.S. EPA's "Guidelines for Determining Capture Efficiency," (January 9, 1995) and 40 CFR 51, Appendix M, Methods 204 –204f as applicable.

6.6 **Determination of Alternative Compliance.** Alternative compliance (as specified in section 4.3) shall be determined by U.S. EPA Method 25, 25A, or 25B, Title 40 Code of Federal Regulations, Part 60, Appendix A as applicable. A source is in violation if the measured VOC emissions, as measured by any of the test methods, exceed the standards specified in section 4.3.

6.7 **Metallic Content.** The metallic content of a coating (as specified in section 3.18) shall be determined by South Coast Air Quality Management District Method 318-95, "Determination of Weight Percent Elemental Metal in Coatings by X-ray" (July 1996).

6.8 **Exempt Compound Content.** Exempt compound content, other than as determined pursuant to section 6.1, (as specified in sections 3.15, 3.34 and 3.35) shall be determined by using CARB Method 432, "Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings"(September 12, 1998); CARB Method 422, "Determination of Volatile Organic Compounds in Emissions from Stationary Sources" (January 22, 1987); or, South Coast Air Quality Management District (SCAQMD) Method 303-91, "Determination of Exempt Compounds" (February 1993).

6.9 **Transfer Efficiency.** Spray equipment transfer efficiency (as specified in sections 3.29 and 4.7.5) shall be determined by using South Coast Air Quality Management District "Spray Equipment Transfer Efficiency Test Procedure for Equipment User" (May 24, 1989).

6.10 **HVLP Equivalency.** Spray equipment HVLP equivalency (as specified in section 4.7.4) shall be determined by using South Coast Air Quality Management District "Guidelines for Demonstrating Equivalency with District Approved Transfer Efficient Spray Guns" (September 26, 2002).

7. Construction of Headings. Section and subsection headings do not in any manner affect the scope, meaning, or intent of the provisions of this Suggested Control Measure.

8. Severability. Each part of this Suggested Control Measure shall be deemed severable, and in the event that any part of this Suggested Control Measure is held to be invalid, the remainder of this Suggested Control Measure shall continue in full force and effect.

Appendix B

2002 Automotive Coatings Survey

(Refinish Coatings Only)

2002 Automotive Coatings Survey

(Refinish Coatings Only)

California Environmental Protection Agency

Air Resources Board

TABLE OF CONTENTS

2002 AUTOMOTIVE COATINGS SURVEY

SUBMITTAL OF FORMS

Please return the completed survey to the following address:

Regular Mail

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
ATTN: SSD / Measures Assessment Branch
Automotive Coatings Survey

Overnight

California EPA Headquarters Building
Air Resources Board (6th Floor)
1001 I Street
Sacramento, CA 95814
ATTN: SSD / Measures Assessment Branch
Automotive Coatings Survey

ELECTRONIC SUBMITTAL OPTIONS

Electronic submittal options are available. Details can be obtained by contacting the ARB or by visiting our web site at "www.arb.ca.gov/coatings/auto/survey/2002survey.htm." Additional survey packages can also be downloaded from this site.

QUESTIONS

If you have any questions or other requests please contact any of the following staff:

Name	Phone	Email
Jose Gomez, Manager	916-324-8033	jgomez@arb.ca.gov
Dave Mehl, Survey Lead	916-324-8177	dmehl@arb.ca.gov
Gary Mouradian	916-324-8175	gmouradi@arb.ca.gov
Mark Watkins	916-323-9687	mwatkins@arb.ca.gov

2002 Automotive Coatings Survey

PART A

SURVEY FORMS
AND
INSTRUCTIONS

DUE DATE: SEPTEMBER 30, 2002

2002 California Automotive Coatings Survey		
Air Resources Board, P.O. Box 2815 - Sacramento, CA 95812 - Attention: Stationary Source Division, Measures Assessment Branch		
Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

CONFIDENTIAL INFORMATION SUBMITTAL FORM

If you wish to designate any information contained in your survey data as **CONFIDENTIAL INFORMATION**, please provide the data requested below and return it with your completed survey forms.

In accordance with Title 17, California Code of Regulations (CCR), sections 91000 to 91022, and the California Public Records Act (Government Code Section 6250 et seq.), the information that a company provides to the Air Resources Board (ARB) may be released: (1) to the public upon request, except trade secrets which are not emission data or other information which is exempt from disclosure or the disclosure of which is prohibited by law; (2) to the Federal Environmental Protection Agency (EPA), which protects trade secrets as provided in Section 114(c) of the Clean Air Act and amendments thereto (42 USC 7401 et seq.) and in federal regulation; and, (3) to other public agencies provided that those agencies preserve the protections afforded information which is identified as a trade secret, or otherwise exempt from disclosure by law (Section 39660(e)).

Trade secrets as defined in Government Code Section 6254.7 are not public records and therefore will not be released to the public. However, the California Public Records Act provides that air pollution emission data are always public records, even if the data comes within the definition of trade secrets. On the other hand, the information used to calculate air pollution emissions may be withheld from the public if the information is a trade secret.

If any company believes that any of the information it provides is a trade secret or otherwise exempt from disclosure under any other provision of law, **it must identify the confidential information as such at the time of submission to the ARB and must provide the name, address, and telephone number of the individual to be consulted** if the ARB receives a request for disclosure or seeks to disclose the data claimed to be confidential. The ARB may ask the company to provide documentation of its claim of trade secret or exemption at a later date. Data identified as confidential will not be disclosed unless the ARB determines, in accordance with the above referenced regulations, that the data does not qualify for a legal exemption from disclosure. These regulations establish substantial safeguards before any such disclosure.

In accordance with the provisions of Title 17, California Code of Regulations, sections 91000 to 91022, and the California Public Records Act (Government Code Sections 6250 et seq.),

Company Name: _____ declares that only those portions ***specifically identified*** and submitted in response to the California Air Resources Board's information request on the survey are confidential "**trade secret**" information, and requests that it be protected as such from public disclosure. All inquiries pertaining to the confidentiality of this information should be directed to the following person:

Name (please print): _____

Signature: _____

Title: _____

Telephone #: _____

Mailing Address: _____

_____

2002 California Automotive Coatings Survey		
Air Resources Board, P.O. Box 2815 - Sacramento, CA 95812 - Attention: Stationary Source Division, Measures Assessment Branch		
Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

FORM 1

General Information – Reporting Year 2001

Company Name:		Web Site:
Division:		
Address:		
City:	State:	Zip:
Contact Person:	Position:	
Phone:	FAX:	e-mail:

1) Did your company manufacture and distribute coatings in 2001 (for use in California) for motor vehicles or mobile equipment, or coatings that you know to be used in those types of applications? **YES** **NO**

2) Did your company distribute coatings in 2001 (for use in California) manufactured by another company, which are for motor vehicles or mobile equipment, or that you know are used in those types of applications? **YES** **NO**
If yes, please list these companies along with a mailing address and contact person. (Please use a separate sheet of paper labeled as question 2.)

3) Did your company manufacture coatings for another company to distribute in 2001 that are for motor vehicles or mobile equipment, or that you know are used in those types of applications? **YES** **NO**
If yes, please list these companies along with a mailing address and contact person. (Please use a separate sheet of paper labeled as question 3.)

4) Is your company a wholly owned subsidiary of another company? **YES** **NO**
If yes, please list the name of the parent company along with a contact person's name and position, complete mailing address, telephone and facsimile numbers, and an e-mail address for the contact person. (Please use a separate sheet of paper labeled as question 4.)

If you answered "Yes" to question 1, 2 or 3 please complete the remainder of the survey prior to returning it to the ARB. If you answered "No" to all these questions, please return only this form.

CERTIFICATION by Authorized Official

I hereby certify that, to the best of my knowledge and belief, all information entered on Form 1 – General Information, Form 2 – Company Information, Form 3 – Product Information, Form 4 – Ingredient Information, and Form 5 Ready-To-Spray Information is complete and accurate.

Name:	Position:
Signature:	Date:

2002 California Automotive Coatings Survey		
Air Resources Board, P.O. Box 2815 - Sacramento, CA 95812 - Attention: Stationary Source Division, Measures Assessment Branch		
Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

FORM 2
Company Information – Reporting Year 2001

Type of Business (check all that apply) ❑ Manufacturer ❑ Importer ❑ Retail Distributor ❑ Wholesale Distributor ❑ Private Label Manufacturer ❑ Toll Manufacturer ❑ Other (Specify):	**Company Marketing Classification** (check one) ❑ International ❑ National ❑ Regional (e.g., western U.S.) list: ❑ California Statewide ❑ California Region (e.g. Southern California) list:
Company – Gross Annual Receipts ($) for Calendar Year 2001 (check one) ❑ Less than 500,000 ❑ 500,000 to 1 million ❑ >1 million to 2 million ❑ >2 million to 5 million ❑ >5 million to 10 million ❑ >10 million to 100 million ❑ >100 million to 1 billion ❑ >1 billion	**Company – California Gross Annual Receipts ($) for Calendar Year 2001** (check one) ❑ Less than 500,000 ❑ 500,000 to 1 million ❑ >1 million to 2 million ❑ >2 million to 5 million ❑ >5 million to 10 million ❑ >10 million to 100 million ❑ >100 million to 1 billion ❑ >1 billion
Automotive Coatings – Gross Annual Receipts ($) for Calendar Year 2001 (check one) ❑ Less than 500,000 ❑ 500,000 to 1 million ❑ >1 million to 2 million ❑ >2 million to 5 million ❑ >5 million to 10 million ❑ >10 million to 100 million ❑ >100 million to 1 billion ❑ >1 billion	**Automotive Coatings – California Gross Annual Receipts ($) for Calendar Year 2001** (check one) ❑ Less than 500,000 ❑ 500,000 to 1 million ❑ >1 million to 2 million ❑ >2 million to 5 million ❑ >5 million to 10 million ❑ >10 million to 100 million ❑ >100 million to 1 billion ❑ >1 billion
Employees for Calendar Year 2001 (check one) ❑ Less than 10 ❑ 10 to 99 ❑ 100 to 249 ❑ 250 to 499 ❑ 500 or more	**Employees–California for Calendar Year 2001** (check one) ❑ Less than 10 ❑ 10 to 99 ❑ 100 to 249 ❑ 250 to 499 ❑ 500 or more
Automotive Coatings Employees for Calendar Year 2001 (check one) ❑ Less than 10 ❑ 10 to 99 ❑ 100 to 249 ❑ 250 to 499 ❑ 500 or more	**Automotive Coatings Employees – California for Calendar Year 2001** (check one) ❑ Less than 10 ❑ 10 to 99 ❑ 100 to 249 ❑ 250 to 499 ❑ 500 or more
How did you determine California Year 2001 Sales Volume? (check all that apply) ❑ Direct California retail sales ❑ Direct California wholesale distribution ❑ Other (explain):	❑ Prorated from national retail sales ❑ Prorated from national wholesale distribution

2002 California Automotive Coatings Survey		
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FORM 3
Product Information – Reporting Year 2001

Entry # : *	
Product Code:	
Product Name:	
Brand and Product Line(s):	

Physical And Other Data					
Type Code (10 – 60)	Specify (for codes 10, 20, 40 and 60 only)	Coverage (ft^2/gal)	Recommended Thickness (mil)	Water or Solvent Borne (W or S)	Density (lbs/gal)

Weight Percent				Volume Percent			
Solids	Volatile Material	Water	Exempts	Solids	Volatile Material	Water	Exempts

As Packaged	
VOC Actual (g/l)	VOC Regulatory - Less Water & Exempts (g/l)

2001 California Sales (gallons)

* Note: This entry # must also appear on your corresponding FORM 4.

Page _____ of _____ Enter the current page # out of the total pages submitted.

NOTE: Each FORM 3 must have a corresponding FORM 4.

Photocopy this page as necessary

2002 California Automotive Coatings Survey		
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Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

FORM 4
Ingredient Information – Reporting Year 2001

	Entry # from FORM 3:			
#	Ingredient	Bin # *	CAS #	wt %**
	Aggregated ingredients < 0.1 wt. %	N/A	N/A	
		Total of All Ingredients (Must Equal 100%)		

* For hydrocarbon solvents only. Refer to page 25 or contact solvent supplier for bin #.

** Enter the weight percent for each ingredient that is at least 0.1% of the total mass of the product. Toxic air contaminants (e.g., lead and nickel) should be reported to lower than 0.1% if known.

Page _____ of _____ Enter the current page # out of the total pages submitted.

NOTE: Each FORM 4 must have a corresponding FORM 3.

Photocopy this page as necessary

2002 California Automotive Coatings Survey		
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FORM 5
Ready-To-Spray (RTS) Information – Reporting Year 2001

Note: RTS mixtures within a single product line may be grouped if the mixing ratios remain constant and all possible combinations are viable products.

For each combination of products listed in Form 3 that requires mixing to be RTS please list the following:

Ready-To-Spray Mixture #				
Mixing Components Entry #: (from Form 3)				
Mixing Ratio:				
Recommended Thickness (mil)				

Production Cost ($/gal)		
Minimum	Sales Weighted Average	Maximum

If grouping 4 or more RTS mixtures from the top table please complete both of the following tables. If reporting one RTS mixture or grouping 3 or less RTS mixtures, please complete just the appropriate number of columns of the first table.

	low	median	high
VOC regulatory			
Color			
Density			
Coverage			
VOC actual			

	Low	median	high
VOC actual			
Color			
Coverage			
Density			
VOC regulatory			

Page _____ of _____ Enter the current page # out of the total pages submitted.

Photocopy this page as necessary

2002 California Automotive Coatings Survey		
Air Resources Board, P.O. Box 2815 - Sacramento, CA 95812 - Attention: Stationary Source Division, Measures Assessment Branch		
Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

Form 1 Instructions
General Information – Reporting Year 2001

The information requested on Form 1 will be used by the California Air Resources Board to determine what companies distribute motor vehicle and mobile equipment coatings (automotive coatings) for sale in California. These companies will be required to complete the survey, based on the coatings sold in calendar year 2001. If your company is not a paint manufacturer, but is listed as "manufactured for" or "distributed by" on the product label, you are responsible for completing the requested information in this survey. You are encouraged to coordinate your responses with the appropriate manufacturer of your product to avoid double reporting of data. Holding companies or subsidiaries may also need to complete this survey.

Company Name: The legal business name of your company. If you are completing this survey for more than one company, please submit different surveys for each company.
Web Site: The company web site address, for example, www.paintcompany.com.
Division: If the company has multiple divisions, please specify which division this survey was completed for.
Address: Enter street address or post office box of your company where mail is received.
City: The city where mail is received.
State: The state where mail is received.
Zip: Enter the postal zip code at which mail is received
Contact Person: Name of the person to be contacted if there are questions about survey responses.
Position: Business position of the contact person.
Phone: Telephone number of the contact person.
Fax: Fax number of the contact person.
e-mail: e-mail address of the contact person.

Please answer questions 1 through 4. List requested information where appropriate.

If you answered yes to question 1, 2 or 3, please also complete Forms 2, 3, 4 and 5. If you answered no to these questions, please return only the completed Form 1 to the ARB at the address listed on page 2.

Certification: Please have a responsible company officer (President, Treasurer, Secretary, or Vice-President of a principle business function) certify that the General Information (Form 1), Company Information (Form 2), Product Information (Form 3), Ingredient Information (Form 4), and Ready-To-Spray Information (Form 5) is complete and accurate. This person is to clearly print or type his name and business position, and sign and date the form where indicated.

2002 California Automotive Coatings Survey		
Air Resources Board, P.O. Box 2815 - Sacramento, CA 95812 - Attention: Stationary Source Division, Measures Assessment Branch		
Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

Form 2 Instructions
Company Information – Reporting Year 2001

Type of Business: Check all boxes that describe the types of business conducted by your company.

Manufacturer – A company that produces, packages, or repackages motor vehicle or mobile equipment coatings for sale or distribution in California.

Importer – A company that brings motor vehicle or mobile equipment coatings into the United States for sale or distribution within California.

Retail Distributor – A company who sells or supplies motor vehicle or mobile equipment coatings at the retail level.

Wholesale Distributor - A company who sells or supplies motor vehicle or mobile equipment coatings for the purpose of resale or distribution in commerce at the wholesale level.

Private Label Manufacturer – A company that manufactures motor vehicle or mobile equipment coatings for sale under another company's name.

Toll Manufacturer – A company that manufactures motor vehicle or mobile equipment coatings based on the formula of another company and places that company's name on the product label.

Company Marketing Classification: Check the box that best describes your company's primary marketing classification.

International – Two or more nations. For example, United States, Canada, and Mexico.

National – All of the United States.

Regional – A portion of the United States. For example, California, Oregon, and Arizona.

California Statewide – All of California.

California Local – A portion of California. For example, Southern California or the San Francisco Bay Area.

The information on annual receipts and employees should be provided for both the company and the automotive coatings unit, as appropriate.

Gross Annual Receipts: Check the box which identifies the gross annual receipts generated by your company. This means the total income of the company before expenses are deducted.

Gross Annual Receipts - California: Check the box which identifies the gross annual receipts generated by your company in California.

Employees: Check the box that indicates the total number of full-time equivalent employees of the company.

Employees - California: Check the box that identifies the number of full-time equivalent employees in California.

How did you determine California Year 2001 Sales Volume?: Check the box that best identifies the method used to determine California sales volume for use on Form 3.

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Form 3 Instructions
Product Information – Reporting Year 2001

Entry # : Each Form 3 completed must be numbered sequentially, beginning with "1." This entry # must also appear on your corresponding Form 4 and will be used in completing Form 5.
Product Code: Enter product code.
Product Name: Enter the product / label name for the product code above.
Product Line(s): Enter the product line(s) which the coating is used in.

Type Code: Enter the code from the Type Code table, on page 11 that best describes the coating.
Specify: If the Type Code entered was 10, 20, 40 or 60, please clarify/specify what type of coating it is.
Coverage: Specify the coverage of the coating when applied at the recommended thickness, in terms of square feet per gallon of coating.
Recommended Thickness: Specify the recommended thickness used in determining the coatings' coverage, in mils.
Water or Solvent Borne: Note if the coating is solvent (by marking "S") or water (by marking "W") borne.
Density: Density of the coating in pounds per gallon (lbs/gal).

Weight Percent of Solids: Solids content of the coating expressed as a percentage of total coating weight.
Weight Percent of Volatile Material: Volatile material (VOC+water+exempts) content expressed as a percentage of total coating weight. See page 22 for the definition of VOC (volatile organic compound) and VOC content.
Weight Percent of Water: Water content as a percentage of total coating weight.
Weight Percent of Exempts: Exempt compounds content expressed as a percentage of total coating weight. See page 18 for definition of exempt compounds.
Volume Percent of Solids: Solids content of the coating expressed as a percentage of total coating volume.
Volume Percent of Volatile Material: Volatile material (VOC+water+exempts) content expressed as a percentage of total coating volume. See page 22 for the definition of VOC (volatile organic compound) and VOC content.
Volume Percent of Water: Water content expressed as a percentage of total coating volume.
Volume Percent of Exempts: Exempt compounds content expressed as a percentage of total coating volume. See page 18 for definition of exempt compounds.

VOC Actual: Also known as Material VOC. VOC content of coating, as supplied, in grams of VOC per liter of coating. This is the weight of all volatile materials less the weight of water and exempt compounds per the entire volume of the coating. This is NOT the same as VOC Regulatory. See "VOC Calculations" page 23.
VOC Regulatory (Less Water & Exempts): Also known as Coating VOC. VOC content of the coating, as supplied, in grams of VOC per liter of coating less water and exempt compounds. This may be determined from the formulation data or previously determined by EPA Method 24, 40 CFR Part 60, as amended in Federal Register Vol. 57, No. 133, July 10, 1992, or ASTM D 3960-92. See "VOC Calculations" page 23.

2001 California Sales: The volume, in gallons, of the coating sold in California in 2001.

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Form 3 Instructions, Continued
Type Codes

Coating Type	Code
Undercoat (specify)	10
primer	11
primer sealer	12
primer surfacer	13
pretreatment wash primer	14
precoat	15
ground coat	16
flexible primer	17
plastics primer	18
Color coat (specify)	20
single-stage	21
single-stage multicolor	22
multi-stage color coat	23
multi-stage multicolor coat	24
camouflage	25
metallic/iridescent	26
Clearcoat	30
Additive (specify)	40
reducer	41
hardener	42
catalyst	43
activator	44
extender	45
flattener	46
plasticizer	47
fish eye eliminator	48
accelerator	49
Truck bed coating	51
Underbody coating	52
Temporary protective coating	53
Uniform finish coating	54
Anti-glare/safety coating	55
Other (specify)	60

Please use the major category code if a coating does not fall within one of the more specific codes. For example, if a coating is an additive (uniform finish blender) which is not one of the specific additives listed, use code 40. "Uniform finish blender" would then be listed under "Specify."

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Form 4 Instructions
Ingredient Information – Reporting Year 2001

Form 4 requests product ingredient information. In this table provide all ingredients which are part of the product formulation. Complete one Form 4 for each Form 3 completed.

Entry # From Form 3: Enter the Entry # from corresponding Form 3.

#: Number each ingredient sequentially, beginning with "1."

Ingredient: Enter the standard (IUPAC) chemical name of the ingredient. Chemical names must be distinguished from trade names, by labeling trade names with an asterisk prior to the name . For example, the desired chemical name of SD 40 Alcohol or ethyl alcohol is ethanol. Only enter the trade name of the ingredient if the chemical name is unknown. If the ingredient is proprietary or a mixture (e.g., petroleum distillates) identify the trade name and manufacturer / primary supplier.

Resin entries should be grouped by resin type instead of listing each specific resin composition. Report only the total weight percentage for each resin group. Please choose from the resin types in the table below. If the resin does not fit within one of these categories, please contact Dave Mehl at (916) 361-0342 or dmehl@arb.ca.gov to help you determine a resin type, for data consistency.

Resin Types		
Acrylic	Epoxy	Silicone, Silane, Siloxane
Acrylic Copolymer	Oleoresin	Styrene-butadiene
Alkyd	Phenolic	Urethane, Polyurethane
Amines, Amides	Polyester (Not Alkyd)	Polyvinyl Chloride (PVC)
Cellulosic	Polyvinyl Acetate (PVA)	Vinyl Toluene
Chlorinated Rubber	Shellac	Vinyl Acrylic Copolymer

NOTE: *The volatile portions of resin solutions, colorants or additives must be listed as separate ingredient entries. For example, do not include the volatile portion of a resin solution as a solid.*

Bin #: For aliphatic or aromatic hydrocarbon solvents enter the bin number that best represents the nature of the solvent from page 25.

CAS#: Enter the Chemical Abstract Service (CAS) number for the ingredient.

Weight % (of total material): Enter the percent by weight for each ingredient in the final product that is at least 0.1% of the total mass of the product. Toxic air contaminants (e.g., lead and nickel) should be reported to lower than 0.1% if known. If an ingredient is a mixture of known components, list the components separately with their individual weight percentages in the final product. If the components of a mixture cannot be determined, list the ingredient as a single entity. For example, you may not know the weight percentage of individual ingredients of petroleum distillates, resins, or biocides. In cases such as these identify the weight percent of the mixture.

Total of All Ingredients: The sum of all ingredients in the table must equal 100.00 percent by weight. If this value does not sum to 100.00, please recheck the information.

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Form 5 Instructions
Ready-To-Spray Information – Reporting Year 2001

Ready-To-Spray Mixture#: Number entries sequentially, beginning with "1."

Mixing Components: List entry #s from Form 3 for all components to be mixed together to create a Ready-To-Spray (RTS) coating, in the same order as the mixing ratio. RTS mixtures within a single product line may be grouped if the mixing ratios remain constant and all possible combinations are viable products.

Tints from within a product line can be grouped together for reporting ready-to-spray mixtures, instead of reporting for each individual color combination. When grouping tints within a product line, the mixing component listed would be the name of the product line and "tints," e.g. "Supernova tints." Please identify the relevant Form 3 entry #s for the "grouped" tints.

Example:

Ready-To-Spray Mixture #	2			
Mixing Components Entry #: (from Form 3)	Supernova tints, 4 – 53 & 56 – 60	92		
Mixing Ratio:	2	1		

Other components of a RTS coating can also be grouped, i.e. reducers, hardeners, or even a main component, such as primers. More than one category can be grouped on one form. For example, if the first column is a clear coat, the second column could be the various hardeners and the third column the reducers, similar to the example below. However, every possible combination represented in the grouping matrix must be an actual marketed RTS product. Please remember that it is only possible to have grouping on this form if the mix ratios are identical for every possible combination.

Example:

Ready-To-Spray Mixture #	3			
Mixing Components Entry #: (from Form 3)	5	10, 11, 12	20, 21, 22	
Mixing Ratio:	4	1	1	

The above table would yield 9 different post-mixing combinations: 5-10-20, 5-10-21, 5-10-22, 5-11-20, 5-11-21, 5-11-22, 5-12-20, 5-12-21, and 5-12-22.

2002 California Automotive Coatings Survey		
Air Resources Board, P.O. Box 2815 - Sacramento, CA 95812 - Attention: Stationary Source Division, Measures Assessment Branch		
Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

If not all of the above combinations are actual marketed combinations, then it cannot be grouped as above. For example if 5-11-20 and 5-11-21 are not marketed combinations then at least 2 Form 5s would need to be submitted, such as

Ready-To-Spray Mixture #	3			
Mixing Components Entry #: (from Form 3)	5	10, 11, 12	22	
Mixing Ratio:	4	1	1	

and

Ready-To-Spray Mixture #	4			
Mixing Components Entry #: (from Form 3)	5	10, 12	20, 21	
Mixing Ratio:	4	1	1	

Mixing Ratio: The relative ratio, by volume, of each component to be mixed to create a ready-to-spray coating, in the same order as the mixing components.

Recommended Thickness: Specify the recommended thickness used in determining the RTS coatings' coverage, in mils.

Production Cost, Minimum: Indicate the lowest production cost for a RTS mixture from the form, in dollars per gallon ($/gal). Production cost includes the cost of materials plus labor.

Production Cost, Sales Weighted Average: Indicate the sales weighted average production cost of the RTS mixtures from the form, in dollars per gallon ($/gal). Production cost includes the cost of materials plus labor.

Production Cost, Maximum: Indicate the highest production cost for a RTS mixture from the form, in dollars per gallon ($/gal). Production cost includes the cost of materials plus labor.

For VOC actual and VOC regulatory report your lowest, median, and highest color. For each color reported, report the corresponding information on the coverage, density, and either VOC actual or VOC regulatory as appropriate. If grouping 4 or more RTS mixtures from the first table, complete both of the tables. If reporting one RTS mixture or grouping 3 or less RTS mixtures, complete just the appropriate number of columns of the first table.

Coverage: Specify the coverage of the coating when applied at the recommended thickness, in terms of square feet per gallon of coating.

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Phone: 916.324.8023	FAX: 916.324.8026	www.arb.ca.gov/coatings/auto/survey/2002survey.htm

Density: Density of the coating in pounds per gallon (lbs/gal).

VOC Actual: Also known as Material VOC. VOC content of coating, as supplied, in grams of VOC per liter of coating. This is the weight of all volatile materials less the weight of water and exempt compounds per the entire volume of the coating. This is NOT the same as VOC Regulatory. See "VOC Calculations" page 23.

VOC Regulatory (Less Water & Exempts): Also known as Coating VOC. VOC content of the coating, as supplied, in grams of VOC per liter of coating less water and exempt compounds. This may be determined from the formulation data or previously determined by EPA Method 24, 40 CFR Part 60, as amended in Federal Register Vol. 57, No. 133, July 10, 1992, or ASTM D 3960-92. See "VOC Calculations" page 23.

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Submitting Survey Forms or Data

Option 1: For each form type, assemble the pages in numerical entry order, beginning with Form 1 and continuing through Form 5.

Option 2: Same as Option 1, except group each Form 4 with its corresponding Form 3.

Option 3: Submit Data Electronically.

Survey data may be submitted electronically. The file formats, in order of preference, are:

1. Microsoft Access
2. Microsoft Excel
3. ASCII tab delimited file

If you wish to submit survey data in any other electronic format, please contact us for additional information.

To obtain information on file formats visit www.arb.ca.gov/coatings/auto/survey/2002survey.htm

Appendix C

Summary of Cost Analysis Methodology

Summary

The total cost of the proposed SCM to affected businesses is estimated to be $65 million in nonrecurring costs and $5.7 million per year in recurring costs. This equates to $13.9 million dollars annually over the useful life of the control equipment. This represents the cost of raw materials, research and development, and changes to distribution for the manufacturers, and the cost of new equipment, training, and energy costs to automotive refinishing facilities. The annual average cost to a typical automotive coatings manufacturer is estimated to be $320,000. The annual average cost to a typical automotive refinishing facilities is estimated to be about $3,400.

Methodology

For this analysis, we considered the impact on two groups of businesses; coating manufacturers and automotive refinishing facilities. The total cost of the proposed SCM represents the combined costs to these two groups. Distributors of automotive coatings may also incur some costs if those costs cannot be passed on to the automotive refinishing facilities because of competitive pressures. However, we are unable to quantify these impacts. Potential costs to distributors include some cost sharing between the manufacturer and distributor to transition customers to new products such as water-borne color coatings. Staff does not have data on the extent to which such cost sharing might occur.

Cost to Businesses

The total cost to coating manufacturers is estimated to be $14.4 million in non-recurring costs. This equates to $3.2 million in annual cost. This estimate includes the cost to market and distribute compliant coatings in California, and is based on discussions with manufacturers (Taylor, 2005).

The total cost to automotive refinishing facilities is estimated to be $65 million in non-recurring costs and $5.7 million per year in recurring costs, assuming coating manufacturers pass on all their costs to automotive refinishing facilities. This equates to $13.9 million dollars annually. The non-recurring costs include the cost of obtaining air movement and heating equipment which may be necessary to use water-borne coatings and maintain the level of production, and equipment and training costs associated with switching from solvent-borne to water-borne coatings.

Staff estimates there are about 4,100 automotive refinishing facilities in California. Since the large number of facilities makes it impractical to determine the impact on each facility, staff divided these facilities into general categories based on their annual revenue. Also, based on SCAQMD data, staff estimated the statewide number of heated spray booths and automotive refinishing facilities with multiple spray booths. Staff acknowledges that some facilities will experience cost impacts that differ from these estimates, but based on discussions with industry, the general assumptions are valid for typical facilities within each category. Table C-1 provides an overall summay of costs. Tables C-2 through C-4 summarize the estimated breakdown of costs for

automotive refinishing facilities (Elders, 2005; Decker, 2005; Phillips, 2005; SCAQMD, 2005; Taylor, 2005; Hagan, 2005; Mac, 2005; Phillips, 2005).

Table C-1
Summary of Costs

Annual Revenue Category	Less Than 1 Million	Between 1 Million and 2.5 Million	Greater Than 2.5 Million	**Total**
Number of Facilities	**2,952**	**883**	**278**	**4,113**
Facilities with One Booth/No Heat	2,332			
Non-Recurring Cost per Facility	6,600			
Annualized Cost	1,648			
Facilities with Two Booths/No Heat	620	503		**1,123**
Non-Recurring Cost per Facility	8,200	42,000		
Annualized Cost	1,871	7,966		
Facilities with Two Booths/Existing Heat		380	69	**449**
Non-Recurring Cost per Facility		16,000	48,000	
Annualized Cost		4,327	9,685	
Facilities with Three Booths/Existing Heat			209	**209**
Non-Recurring Cost per Facility			68,000	
Annualized Cost			12,484	
Total Cost	20,475,200	27,206,000	7,524,000	**65,205,200**
Total Annualized Cost	5,002,416	5,651,032	3,277,324	**13,930,772**

Table C-2
Estimated Cost for Facilities with Annual Revenue Less Than 1 Million

Category	Item	Non-Recurring Costs	Recurring Costs	Annualized Cost*
Single Booth with No Heating Equipment	Air Movement Equipment	1,600		144
	Other Equipment	1,500		185
	Training	1,000		225
	Material Loss	2,500		562
	Operating and Maintenance Costs		155	155
	Increased Cost of Coatings		378	378
	Total	**6,600**		**1,648**
Two Booths with No Heating Equipment	Air Movement Equipment	3,200		288
	Other Equipment	1,500		185
	Training	1,000		225
	Material Loss	2,500		562
	Operating and Maintenance Costs		235	235
	Increased Cost of Coatings		378	378
	Total	**8,200**		**1,871**

Table C-3
Estimated Cost for Facilities with Annual Revenue Between 1 Million and 2.5 Million

Category	Item	Non-Recurring Costs	Recurring Costs	Annualized Cost*
Two Booths with No Heating Equipment	Air Movement Equipment	10,000		899
	Heating Equipment	26,000		2,338
	Other Equipment	1,500		185
	Training	2,000		449
	Material Loss	2,500		562
	Operating and Maintenance Costs		1,875	1,875
	Increased Cost of Coatings		1,657	1,657
	Total	**42,000**		**7,966**
Two Booths with Existing Heating Equipment	Air Movement Equipment	10,000		899
	Other Equipment	1,500		185
	Training	2,000		449
	Material Loss	2,500		562
	Operating and Maintenance Costs		575	575
	Increased Cost of Coatings		1,657	1,657
	Total	**16,000**		**4,327**

Table C-4
Estimated Cost for Facilities with Annual Revenue Greater Than 2.5 Million

Category	Item	Non-Recurring Costs	Recurring Costs	Annualized Cost*
Two Booths with Existing Heating Equipment	Air Movement Equipment	40,000		3,598
	Other Equipment	1,500		185
	Training	4,000		899
	Material Loss	2,500		562
	Operating and Maintenance Costs		2,075	2,075
	Increased Cost of Coatings		2,367	2,367
	Total	**48,000**		**9,685**
Three Booths with Existing Heating Equipment	Air Movement Equipment	60,000		5,396
	Other Equipment	1,500		185
	Training	4,000		899
	Material Loss	2,500		562
	Operating and Maintenance Costs		3,075	3,075
	Increased Cost of Coatings		2,367	2,367
	Total	**68,000**		**12,484**

Impact on Businesses

In evaluating the impact of the SCM on businesses, we assumed that all costs were either completely absorbed by coating manufacturers or by automotive refinishing facilities. This gives us a worst-case scenario for coating manufacturers and automotive refinishing facilities. In reality, it is likely that coating manufacturers and automotive refinishing facilities will absorb and pass on some of the cost, making the actual impact to businesses less than what is estimated here.

To determine the maximum possible impact on coating manufacturers, we assumed they would absorb all costs relating to producing and marketing compliant coatings when calculating the change in "return on owner's equity "(ROE). ROE is calculated by dividing the net profit by the net worth.

To calculate the change in ROE, we subtracted the cost to manufacturers from profit data. The results were used to calculate an adjusted three-year average ROE. The adjusted ROE was then compared with the ROE before the subtraction of the adjusted cost to determine the potential impact on the profitability of the businesses. A reduction of more than 10 percent in profitability is considered to indicate a potential for significant adverse economic impacts. The analysis found an average decrease in ROE of about 0.07 percent for coating manufacturers and 15 percent for automotive refinishing facilities.

To determine the maximum impact on automotive refinishing facilities, we assumed that manufacturers would pass on all costs from the SCM to the automotive refinishing facilities. To project a worst-case scenario, we assumed the automotive refinishing facilities would absorb all costs that they directly incur, as well as all costs passed on by the manufacturers. As with the manufacturers, staff calculated the change in ROE for these automotive refinishing facilities.

To determine the maximum impact on consumers, staff assumed that all costs from both the manufacturers and automotive refinishing facilities would be passed on to the consumers. If costs were passed on to the consumer, the impact would generally be in the form of higher insurance premiums and the total cost would be spread out among several million insured drivers in California. The impact to an individual consumer would be based on a number of factors such as type of insurance, driving history, and demographics. For this analysis, we assume costs would be directly passed on to consumers who need automotive refinishing. In this case, the average cost of having a vehicle refinished would increase by about $11. If the consumer is paying for the refinishing directly, he or she would have to absorb the entire cost.

Annualized Costs

We annualized non-recurring fixed costs using the Capital Recovery Method. Using this method, we multiplied the non-recurring fixed costs by the Capital Recovery Factor

(CRF) to convert these costs into equal annual payments over a project horizon at a discount rate. The Capital Recovery Method for annualizing fixed costs is recommended by Cal/EPA (Cal/EPA, 1996), and is consistent with the methodology used in previous cost analyses for ARB regulations (ARB, 2000a; ARB, 2000b).

The CRF is calculated as follows:

$$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$$

where,

CRF = *Capital Recovery Factor*
i = *discount interest rate in real terms (assumed to be 4%)*
n = *project horizon or useful life of equipment*

The costs of air movement and heating equipment for automotive refinishing facilities were annualized over 15 years, and all other equipment costs were annualized over 10 years. These values are based on an estimate of the expected lifetime of the equipment. All other costs were annualized over 5 years. The total annualized cost was obtained by adding the annual recurring costs to the annualized fixed costs derived by the Capital Recovery Method. With regard to the discount rate, Cal/EPA recommends 2% plus the current yield for a U.S. Treasury Note of similar maturity to the project horizon. Treasury yields have been around 4% in recent years and when adjusted for an inflation rate of 2%, the corresponding discount rate is 4%. (CNN, 2005).

REFERENCES

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Appendix D

Categories that are not in the SCM

The following district and U.S. EPA national rule categories have been reclassified into one or more of the categories included in the proposed SCM (see Table IV-1).

Multi-Stage Topcoat System

The proposed SCM restructures the current district rules and establishes individual limits for the color and clear coatings. This restructuring is designed to enhance enforcement of district rules. Currently, most multi-stage systems consist of two stages, a color coating and a clear coating. The first stage of the finish, the basecoat or color coating, contains the pigments that give the finish the desired color. In the case of metallic finishes, the basecoat also contains the "metallic" flakes. The second stage of the finish is the clear coating, a durable finish that protects the basecoat.

The purpose of the basecoat is to achieve the desired color tint and metallic appearance. Color coatings do not contain the additives needed to withstand chemical and ultraviolet deterioration, or the chemicals necessary to achieve a high gloss surface. Basecoats typically contain acrylic enamel, polyester, or urethane resins, and are designed to be easy spraying and quick drying to keep the base free of dirt and other contaminants. The quick-drying effect also locks the metallic flakes in position to achieve a mottle-free finish.

To protect the basecoat, a durable clear coating is applied. This clear coating can often be applied over the color coating after only 15 to 30 minutes of cure time. Clear coatings typically contain acrylic urethane or polyurethane resins, although acrylic enamel and lacquer clears are also available. Clear coatings are designed to flow upon application, resulting in a smooth, glass-like finish in as few as two coats.

Most districts allow for two- and three-stage systems, with some having a four-stage system as well. A two-stage system consists of a basecoat and a clear coating. Three-stage systems are a two-stage system with either a midcoat or groundcoat. Four stage systems are two stage systems with both a midcoat and a groundcoat.

The basecoat is the main color coating. The clear coating provides gloss and durability. Groundcoats are typically tinted primers, however district definitions vary. Midcoats can be translucent color coatings (achieved by adding filler to a color coating to reduce the pigment density) or tinted clear coatings.

ARB staff's evaluation of the multi-stage topcoat system indicates that up to three of the four stages in a four-stage system may be color coatings. Alternatively, two stages of a three-stage system may consist of a clear coating and a modified clear coating.

The composite VOC system was created to provide manufacturers flexibility in complying with lower VOC limits. To comply with the lower VOC limits, manufacturers have formulated lower VOC clear coatings and retained high VOC color coatings.

The methodology for calculating the composite VOC limit for multi-stage systems assumes that the volume of clear coating applied is twice the volume of the color coating. The 2002 Survey data indicate this is not the case. The volume of color coating sold was about 2.5 times the volume of clear coating sold. Consequently, in consultation with the districts, ARB staff split the multi-stage system into two categories for analysis – color coatings and clear coatings.

Most district rules currently specify a multi-stage system limit of 420 or 540 g/l. Because the composite VOC calculation method assumes two gallons of clear coating are applied for every gallon of color coating, manufacturers have focused on lowering the VOC content of the clear coatings. This compliance approach has enabled color coatings to retain a VOC content ranging from 600 to 800 g/l. The proposed SCM sets separate VOC limits for color coatings and clear coatings.

Metallic/Iridescent

Metallic/Iridescent coatings are either a single-stage or multi-stage coating that contains more than 0.042 pounds per gallon (5 g/l) of metal or iridescent particles as applied, where such particles are visible in the dried film.

Metallic colors contain various sizes of aluminum flakes. These flakes have reflective properties and when used in various combinations and/or amounts, modify the optical characteristics of the color. Metallic pigment consists of thin opaque aluminum flakes (made by ball milling either a disintegrated aluminum foil or a rough metal powder and then polishing to obtain a flat, brilliant surface on each particle) or copper alloy flakes (known as bronze pigments). These coatings produce silvery and other metal-like effects. Iridescent coatings contain mica in various sizes to create what is called a pearlescent effect.

Either a metallic or iridescent pigment is mixed with a base color to create the metallic or pearl color. There is no difference between the base color for a solid color and a metallic/iridescent color. They are mixed from the same tint bank at the auto body shop. Thus, metallic/iridescent coatings are included in the color and single-stage coating analyses above.

Primer Sealer

Primer sealers are applied prior to the topcoat, if necessary. Sealers provide adhesion between the topcoat and the surface, provide a neutral colored base for easy coverage, seal sanded surfaces to prevent solvent penetration, and fill minor surface imperfections. Sealer types include lacquer sealers, enamel sealers, and urethane sealers. These sealers are intended to be coated by lacquer, enamel, and urethane topcoats, respectively, and generally require only one coat prior to application of the topcoat. In addition to general sealers, there are specialty sealers available for use on specific problem surfaces.

Some sealers reported in the 2002 Survey comply with the proposed VOC limit. However, some manufacturers have stated that the 250 g/l sealers are intended for the fleet vehicle market and are not suitable for the collision repair industry. Other manufacturers have stated that that they can formulate sealers for the collision repair industry that comply with the proposed limit of 250 g/l. One manufacturer has marketed a compliant sealer to the collision repair industry for almost a year. Primer sealers are included in the primer category. We believe that primer sealers can be formulated to be in compliance with the proposed primer limit. We have included primer sealer in the primer analysis above.

Primer Surfacer

Primer surfacers are typically high-solids automotive coatings applied over prep coats, such as pretreatment coatings, precoat, or adhesion promoters. Primer surfacers function to provide adhesion between the prep coat and the material to be applied over the primer surfacers. They provide corrosion protection, act as a filling material to cover minor surface flaws, and provide a surface that can be easily sanded to a smooth surface. District rules currently establish the same VOC limit for primer surfacers and primers. We propose to continue this in the proposed SCM. We have included primer surfacers in the primer category.

Precoat

Precoats are coatings that are applied directly to bare metal primarily to deactivate the metal surface prior to application of a subsequent coating. Precoats commonly dry by oxidation or chemical polymerization. The SCAQMD treats these coatings as primers. Most other district rules allow for precoat usage at a higher VOC content than primers, but limit the amount of precoat that can be used.

Approximately 65 percent of the coatings reported in the survey as precoats were also listed as plastic primers, which is in conflict with its defined purpose. Another nine percent were listed as surfacers and three percent were listed as ground coats.

Based on this information, the precoat category is included in the primer category. The precoats were included in the primer analysis above.

Camouflage

Camouflage is a pigmented coating used primarily by the military to make it more difficult for vehicles and equipment to be visually located by enemy forces. Camouflage coating can also be applied to hide vehicles and equipment from game by hunters. Camouflage is applied in patterns with different shades of a color.

One district lists camouflage as a specialty coating. Some districts list camouflage as a distinct coating category. The districts that list it as a distinct category only do so for mobile equipment and not for motor vehicles, which are also painted by the military with camouflage. The districts that have this category give it the same VOC limit as their general topcoat limit. For motor vehicles they treat camouflage as any other topcoat. There is nothing in these districts' definitions regarding any special physical properties for camouflage as opposed to any other color coating. Thus, camouflage coatings are included in the color coat analysis above.

Extreme Performance Coatings

Eight districts list extreme performance coatings as a distinct coating category. These districts allow a VOC content of either 420 g/l or 750 g/l. There are four different definitions used in these eight districts. Five districts define extreme performance coatings as coatings which are exposed to extreme environmental conditions such as high temperatures, corrosive or erosional environments, during principal use. One district defines extreme performance coatings as coatings that are intended, during use, to be exposed to: 1) industrial grade detergents, cleaners, or abrasive scouring agents; 2) unprotected shipboard conditions; or 3) corrosive environmental conditions. Another district defines these products as coatings which during intended use are exposed to any of the following conditions: a) industrial grade detergents, cleaners, or abrasive scouring agents; b) extreme environmental conditions as determined by the Air Pollution Control Officer during the vehicle's principal use; c) chronic exposure to corrosive, caustic or acidic agents, chemicals, chemical fumes, chemical mixtures or solution; d) repeated exposure to temperatures in excess of 250 degrees Fahrenheit; or e) repeated heavy abrasion, including mechanical wear and repeated scrubbing with industrial grade solvents, cleaners, or scouring agents. The last district defines these coatings as coatings which during intended use are exposed to any of the following conditions: a) chronic exposure to corrosive, caustic or acidic agents, chemicals, chemical fumes, chemical mixtures or solutions; b) repeated exposure to temperatures in excess of 250 degrees Fahrenheit; c) repeated heavy abrasion, including mechanical wear and

repeated scrubbing with industrial grade solvents, cleansers, or scouring agents; or d) exterior exposure of steel and non-ferrous metal structures.

Only one district lists this type of coating as a specialty coating. This district defines extreme performance coatings as coatings that encounter acute or chronic exposure to salt water, corrosives, caustics, acids, oxidizing agents, wind- or ocean-driven debris, or electromagnetic pulses.

No coatings in this category were reported as being sold in California in 2001. We have no knowledge of anyone applying these coatings to vehicles in California.

Specialty Coating

Specialty coatings are high VOC coatings (up to 840 g/l) that have historically been necessary due to unusual job performance requirements. Specialty coatings include, but are not limited to, truck bed liner coating, adhesion promoter, elastomeric materials, anti-glare/safety coatings, impact resistant coatings, rubberized asphaltic underbody, water hold-out coatings, weld-thru coatings, bright metal trim repair, camouflage, and extreme performance coatings. The U.S. EPA automotive coatings rule defines specialty coatings to include only adhesion promoters, low-gloss coatings, bright metal trim repair coatings, jambing (cut-in) clear coats, elastomeric coatings, impact resistant coatings, underbody coatings, uniform finish blenders, and weld-through primers.

Three districts' (SCAQMD, Antelope Valley AQMD, and Sacramento Metropolitan AQMD) definitions of specialty coating do not contain the "but not limited to" clause or an equivalent phrase. For these districts, only the listed coatings can be used as specialty coatings. One district, Sacramento Metropolitan AQMD, requires manufacturers to specifically designate their specialty coatings as such. For all other districts the definition is not specific.

Specialty coating usage at body shops is limited to either five to ten percent of total coating usage depending upon the district. Some districts have a volume usage as an alternative to the percentage usage. These districts allow one gallon per day or three gallons per month of specialty coating use per facility.

Because of the variability in district requirements, we evaluated each category listed in district rules as a specialty coating individually. ARB staff evaluated what special attributes or function each coating type provides, and what VOC content was necessary to provide said attributes or function. ARB staff then set individual category definitions and higher VOC content limits for categories as necessary.

Elastomeric Material

Elastomeric materials are coatings that are formulated for application over flexible substrates such as plastic parts, elastomeric bumpers, and spoilers. All districts, except for one, and the national rule identify elastomeric materials as specialty coatings. However, only five districts and the national rule have a definition for "elastomeric materials." Two types of products were listed in the 2002 Survey as elastomeric materials. They are elastomeric primers and elastomeric clears. The elastomeric primer mixtures reported in the survey had a slightly higher VOC content than the 250 g/l VOC limit proposed for primers in the SCM. The elastomeric clear mixtures reported in the survey had a VOC content ranging from about 480 to 550 g/l.

Many elastomeric materials are created by using plasticizing additives mixed with another mixture, as opposed to using an elastomeric base component. This allows for a wide variety of elastomeric materials while keeping the number of components to a minimum.

Based on discussions with manufacturers, ARB staff determined that elastomeric additives have a VOC content less than 250 g/l. Therefore, addition of these additives to clear coatings or primers will not result in exceedances of the 250 g/l VOC limits proposed for these categories. Elastomeric clears are included in the clear coating category and elastomeric primers are included in the primer category.

Anti-Glare Safety Coating

Anti-glare safety coatings are coatings that minimize light reflection for safety purposes. The commonly used standard is a reflectance of 25 or less on a 60 degree gloss meter. Some districts restrict usage to the interior of a vehicle. All districts except one identify this as a specialty coating, however the district definitions vary regarding reflection allowed and vehicle application.

No coatings in this category were reported as being sold in California in 2001. We have no knowledge of these coatings being used in California. If these coatings are used in the future, they will be included in the clear coating, color coating, or single-stage coating category, as is appropriate, based on usage.

Impact Resistant Coating

Impact resistant coatings are coatings designed to resist chipping caused by road debris. Typical usage for impact resistant coatings would be on rocker panels. While all districts except one identify this as a specialty coating, only four districts and the U.S. EPA national rule define these coatings.

No coatings in this category were reported as being sold in California in 2001. We have no knowledge of these coatings being used in California. If these coatings are used in the future, they will be included in the clear coating or single-stage coating category, as is appropriate, based on usage.

Water Hold-Out Coating

Water hold-out coating is a coating applied to the interior cavity of doors, quarter panels, and rocker panels for the purpose of corrosion resistance to prolonged water exposure. While all districts and the U.S. EPA national rule include this as a specialty coating, only three districts and the U.S. EPA national rule define the coating. This definition meets the existing district definition of a primer. Therefore, water hold-out coatings are included in the primer category.

No coatings in this category were reported as being sold in California in 2001. We have no knowledge of anyone applying these coatings to vehicles in California.

Weld-Thru Coating

Weld-thru coatings are primers applied to metal immediately prior to welding to provide corrosion resistance. While all districts allow this as a specialty coating, only ten districts and the U.S. EPA national rule define these coatings. This definition meets existing districts' definitions of a primer. Therefore, weld-thru coatings are included in the primer category.

No coatings in this category were reported as being sold in California in 2001. We have no knowledge of anyone applying these coatings to vehicles in California.

Bright Metal Trim Repair

Bright metal trim repair is a coating applied directly to a metal-plated surface to restore the luster and texture of the plated surface. While districts include these products in the specialty coating category, only five districts have a definition for these coatings. The U.S. EPA national rule does not define this type of coating. Four of the five districts with definitions restrict the usage to chrome-plated metal surfaces.

No products were reported in the 2002 Survey as bright metal trim repair. We have no knowledge of anyone applying these coatings to vehicles in California.

Gloss Flattener

Low-gloss coatings, also called gloss flatteners, are coatings that exhibit a gloss reading less than or equal to 25 on a 60 degree gloss meter. The U.S. EPA national rule and 15 district rules include these products in the specialty coating category. However, only the U.S. EPA national rule defines these coatings.

No coatings in this specific category were reported as being sold in California in 2001. As discussed in the clear coating category section above, these coatings can comply with the clear coating VOC limit and do not need a higher VOC limit.

Heat Resistant

Heat resistant coatings are coatings which, during normal use, must withstand temperatures of at least 400 degrees Fahrenheit. Only one district lists this type of coating as a specialty coating.

No coatings in this category were reported as being sold in California in 2001. We have no knowledge of anyone applying these coatings to vehicles in California.

Jambing (Cut-In) Clear Coat

Jambing, or cut-in, clear coats are fast-drying, clear coatings applied to surfaces such as door jambs and trunk and hood edges to allow for quick closure. This coating is only referenced in the U.S. EPA national rule. No districts list this type of coating in their specialty coating definitions.

No coatings in this category were reported as being sold in California in 2001. We have no knowledge of anyone applying these coatings to vehicles in California.