California Environmental Protection Agency

Air Resources Board

Final Statement of Reasons for Rulemaking, Including Summary of Comments and Agency Response

PUBLIC HEARING TO CONSIDER ADOPTION OF PROPOSED AMENDMENTS TO THE REGULATION FOR REDUCING VOLATILE ORGANIC COMPOUND EMISSIONS FROM AEROSOL COATING PRODUCTS AND PROPOSED TABLES OF MAXIMUM INCREMENTAL REACTIVITY (MIR) VALUES, AND ADOPTION OF PROPOSED AMENDMENTS TO METHOD 310, "DETERMINATION OF VOLATILE ORGANIC COMPOUNDS IN CONSUMER PRODUCTS"

Public Hearing Date: June 22, 2000
Agenda Item No: 00-6-1

TABLE OF CONTENTS

I.

INTRODUCTION

On June 22, 2000, the Air Resources Board (the "Board" or "ARB") conducted a public hearing to consider amendments to the Regulation for Reducing Volatile Organic Compound (VOC) emissions from aerosol coating products (the "Aerosol Coating Regulation"; title 17, California Code of Regulations (CCR), sections 94520-94528) and Method 310 (the "Determination of Volatile Organic Compounds in Consumer Products"). Proposed Tables of Maximum Incremental Reactivity (MIR) Values (proposed new sections 94700 and 94701, title 17, CCR) were also considered for adoption at the hearing. An Initial Statement of Reasons for Proposed Rulemaking (ISOR) was prepared and made available to the public on May 5, 2000. The ISOR is incorporated by reference herein. This Final Statement of Reasons for Rulemaking (FSOR) updates the ISOR by identifying and explaining the modifications that were made to the original proposal. The FSOR also summarizes the written and oral comments received during the rulemaking process, and contains the ARB's responses to those comments.

At the hearing, the Board adopted Resolution 00-22, in which the Board approved the proposed amendments to the Aerosol Coating Regulation, the proposed Tables of MIR Values, and the proposed amendments to ARB Method 310. The approved amendments include new reactivity-based VOC limits for 35 aerosol coating product categories. All of these product categories have been subject to mass-based VOC limits in the existing Aerosol Coating Regulation. The approved amendments also modified reporting requirements; added several definitions to the regulation to clarify and explain the reactivity-based provisions; modified Method 310 to support the reactivity-based regulation; and added provisions to describe how to calculate product reactivity for determining compliance. The proposed amendments also reorganized the regulation to accommodate both the reactivity-based and the mass-based provisions (which will remain in effect until the reactivity limits become effective).

The approved amendments included modifications to the originally proposed language. All of the modifications to the original proposal are described in Section II of this FSOR entitled "Modifications Made to the Original Proposal." In accordance with Government Code section 11346.8(c), Resolution 00-22 directed the Executive Officer to adopt the modified regulation after making the modified regulatory language available for public comment, and to make such additional modifications as may be appropriate in light of the comments received.

A "Notice of Public Availability of Modified Text and Availability of Additional Documents and Information," together with a copy of the full text of the modified regulation, with the modifications clearly indicated, was mailed on January 26, 2001, to each of the individuals described in subsections (a)(1) through (a)(4) of section 44, title 1, CCR. Through this action the modified regulation was made available to the

public for a 15-day comment period from January 26, 2001, to February 13, 2001, pursuant to Government Code section 11346.8. During this comment period. No comments were received that warranted further modifications to the Aerosol Coating Regulation or Method 310. However, the Board received comments requesting additional changes and modifications to the Tables of MIR Values contained in sections 94700 and 94701, title 17, CCR.

In light of the comments received, a "Supplemental Notice of Availability of Modified Text" was made mailed on March 15, 2001, to each of the individuals described in subsections (a)(1) through (a)(4) of section 44, title 1, CCR. Through this action the modified Tables of Maximum Incremental Reactivity (MIR) Values were made available to the public for a 15-day comment period from March 15, 2001, to March 30, 2001, pursuant to Government Code section 11346.8. The Executive Officer then determined that no additional changes should be made to the Aerosol Coatings Regulation or the Tables of MIR Values, and subsequently issued Executive Order G-01-009, by which the modified Aerosol Coating Regulation, Tables of MIR Values, and ARB Method 310 were adopted.

As defined in Government Code section 11345.5(a)(6), the Board has determined that this regulatory action will neither create costs or savings to any State agency, nor affect federal funding to the State. The Board has also determined that these amendments will not create costs or impose a mandate upon any local agency or school district, whether or not it is reimbursable by the State pursuant to Part 7 (commencing with section 17500), Division 4, title 2 of the Government Code; or affect other non-discretionary savings to local agencies. In preparing the regulatory proposal, the ARB staff considered the potential economic impacts on California business enterprises and individuals. A detailed discussion of these impacts is included in the ISOR.

The Board has also determined, pursuant to Government Code section 11346.5(a)(3)(B), that the regulation may affect small business. The Board has further determined that no alternative considered by the agency, or that has otherwise been identified and brought to the attention of the agency, would be more effective in carrying out the purpose for which the regulatory action was proposed, or would be as effective and less burdensome to affected private persons, than the action taken by the Board.

II.

MODIFICATIONS MADE TO THE ORIGINAL PROPOSAL

Various modifications to the original proposal were made to address comments received during the 45-day public comment period, and to clarify the regulatory language. These modifications are described below.

A. **Section 94521. Definitions:** In section 94521, a new definition was added for "Polyolefin Adhesion Promoter." This definition defines a new coating category for Polyolefin Adhesion Promoters as a product designed and labeled exclusively to be applied to a polyolefin or polyolefin copolymer surface of automotive body parts, bumpers, or trim parts to provide a bond between the surface and subsequent coats. Polyolefin Adhesion Promoters had previously been included within the category of "Automotive Bumper and Trim Products." However, because of specific solvency requirements for these products a new subcategory was proposed to ensure technological and commercial feasibility.

B. **Section 94522. Limits and Requirements for Aerosol Coating Products:**

The following modifications were made to section 94522:

Section 94522(a)(3). Table of Limits: To ensure technological and commercial feasibility, the reactivity limits were modified for Primers, Exact Match Finishes (automotive), Metallic Coatings, and Clear Coatings. Specifically, the reactivity limit for Primers was raised from 1.11 to 1.20 g O_3/g product. The reactivity limits for Exact Match Finishes (automotive), Metallic Coatings, and Clear Coatings were decreased from 1.77, 1.93, and 1.54; to 1.50, 1.90, and 1.50 g O_3/g product, respectively. A new category and reactivity limit of 2.50 g O_3/g product was added for Polyolefin Adhesion Promoters. Finally, for ease of use, as appropriate, all limits were rounded off to increments of 0.05.

Section 94522(c) and (d): As originally proposed in sections 94522(c) and (d), for products subject to the reactivity limits, a "no new use" provision was included that would prohibit the use of methylene chloride and perchloroethylene in products that did not contain perchloroethylene or methylene chloride in 1997. However, products that contained these compounds in 1997 could continue to be sold as long as the perchloroethylene or methylene chloride content did not increase.

Upon further analysis staff concluded that to completely mitigate the potential adverse impacts from use of these compounds a complete prohibition was necessary. Staff also concluded that there was a

potential for formulating aerosol coatings with trichloroethylene due to its comparatively low reactivity, and that its use should be prohibited as well. Therefore, at the hearing staff proposed, and the Board approved, a complete prohibition on the use of methylene chloride, perchloroethylene and trichloroethylene. All three of these compounds had previously been identified by the Board as Toxic Air Contaminants. Resolution 00-22 contains the Board's rationale and findings regarding the prohibition of these three compounds.

Section 94522(h): Proposed new subsection (h) was further modified in (h)(1)(E) to specify that all compounds present in an amount greater than 0.1 percent by weight of the final aerosol coatings formulation are to be considered ingredients for the purposes of calculating product-weighted maximum incremental reactivity (PWMIR). A new subpart (h)(2)(A) was added to insure some stability in the regulation requirements for coatings formulations, by providing that MIR values for aerosol coatings will not be changed until June 1, 2007. New proposed subpart (2)(B) was added to clarify that any new compounds added to the Tables of MIR values could be used in aerosol coatings formulations.

New subpart (h)(3) was added to set default MIR values for some aromatic hydrocarbon solvents. This was necessary to allow usage of aromatic hydrocarbon solvents with boiling ranges different from those specified in section 94701.

C. Section 94524. Administrative Requirements

Section 94524(c)(2)(F)(2) was modified to clarify reporting requirements for impurities found in raw materials. Among other things, the modified language states that, any ingredient in the final aerosol coatings formulation must be reported if it is present in an amount equal to 0.1 percent by weight of the total formulation. However, for impurities present in a raw material, the impurity need not be reported as an ingredient if it is present in the raw material in an amount less than 0.1 percent by weight for carcinogens, and 1 percent by weight for all other compounds. This approach was suggested by raw material suppliers as a way to appropriately deal with impurities that occur in raw materials used in aerosol coatings formulations, and to make the provisions of the Aerosol Coatings Regulation consistent with federal reporting requirements.

D. Section 94526. Test Methods.

Section 94526(b)(2)(C) was modified to conform to the changes made to section 94524(c)(2)(F)(2).

E. Tables of Maximum Incremental Reactivity (MIR) Values

Section 94700. MIR Values for Compounds: For clarity and greater ease of use by coatings formulators, the listing of MIR values was rearranged to reflect chemical family. Additional and modified MIRs for compounds were also added. The additional compounds were added based on comments received during the 45-day and 15-day comment periods. Staff also modified the MIR values for certain other compounds already listed on the table, based on technical work done by Dr. William Carter.

Section 94701. MIR Values for Hydrocarbon Solvents: Section 94701(b) was modified to more accurately describe that aromatic hydrocarbon solvents must contain at least 98 percent aromatic compounds rather than 100 percent.

All of the changes described above were circulated to the public for and an initial 15-day comment period via a "Notice of Public Availability of Modified Text and Availability of Additional Documents and Information." In light of the comments received, additional modifications were made to the Table of MIR Values for Compounds contained in section 94700, and circulated to the public for a second 15-day comment period via a "Supplemental Notice of Availability of Modified Text." These modifications are described below.

Modifications to the Table of MIR Values for Compounds. Section 94700:

The following compounds were added to the Table of MIR Values for Compounds:

Organic Compound	MIR Value
2-Hexyloxyethanol	2.45
2-(2-Propoxyethoxy) Ethanol	3.00
2-[2-(2-Methoxyethoxy) Ethoxy] Ethanol	2.62
2-[2-(2-Ethoxyethoxy) Ethoxy] Ethanol	2.66
2-(2-Hexyloxyethoxy) Ethanol	2.03
2-[2-(2-Propoxyethoxy) Ethoxy] Ethanol	2.46
2-[2-(2-Butoxyethoxy) Ethoxy] Ethanol	2.24
2,5,8,11-Tetraoxatridecan-13-ol	2.15
3,6,9,12-Tetraoxahexadecan-1-ol	1.90
2-(2-Ethoxyethoxy) Ethyl Acetate	1.50
2-(2-Butoxyethoxy) Ethyl Acetate	1.38
1-phenoxy-2-propanol	1.73
Alkane, Mixed Predominantly (minimally 94%) C13-C14	0.67

- Several additions and deletions to compounds already on the list were made to make the names more consistent with the nomenclature commonly used by industry.

- The MIR value for Ethylene Glycol 2-Ethylhexyl Ether [2(2-Ethylhexyloxy)Ethanol] was changed from 8.26 to 1.71 (g O_3/g ROC). The 8.26 MIR value was listed in error.

III.

SUMMARY OF COMMENTS AND AGENCY RESPONSES

The Board received a number of written and oral comments during the 45-day and the two 15-day comment periods for this regulatory action. A list of commenters is set forth below with the date and form of all comments that were timely filed. Following the list is a summary of each objection or recommendation made regarding the proposal with an explanation of how the proposed action has been changed to accommodate the objection or recommendation, or the reasons for making no change. No comments were submitted by the Office of Small Business Advocate or the Trade and Commerce Agency.

Comments Received During the 45-day Public Comment Period

Abbreviation	*Commenter*
ACC-1	Barbara O. Francis Managing Director American Chemistry Council Written testimony: June 13, 2000
ACC-2	Barbara O. Francis Managing Director American Chemistry Council Written testimony: June 13, 2000
Avery-1	Robert J. Avery Senior Associate, Product Advocacy Eastman Chemical Company Written Testimony: (e-mail) May 11, 2000
CIT	John H. Seinfeld, Ph.D. Louis E. Nohl Professor California Institute of Technology Written testimony: June 14, 2000
CMA	Courtney M. Price Vice President, CHEMSTAR Chemical Manufacturers Association Written testimony: May 31, 2000

CSMA	D. Douglas Fratz Vice President, Scientific & Technical Affairs Joseph T Yost Senior State Affairs Representative Chemical Specialties Manufacturers Association Written Testimony: June 20, 2000 Oral Testimony: June 22, 2000
CTFA	Thomas J. Donegan, Jr. Vice President, Legal and General Counsel The Cosmetic, Toiletry, and Fragrance Association Written testimony: June 21, 2000
EPC	Robert J. Fensterheim Executive Director Emulsion Polymers Council, Inc. Written testimony: June 21, 2000
EM-1	Janet S. Catanach Environmental Specialist Exxon-Mobil Chemical Written testimony: (e-mail) June 16, 2000
3M-1	Longine P. Beck Senior Product Responsibility Specialist 3M Written testimony: June 20, 2000
3M-2	Longine P. Beck Senior Product Responsibility Specialist 3M Written testimony: June 20, 2000
3M-3	Longine P. Beck Senior Product Responsibility Specialist 3M Written testimony: May 12, 2000
3M-4	Dennis Stein Senior Specialist, Product Responsibility 3M Oral testimony: June 22, 2000

NRDC/CCA	Tim Carmichael Executive Director Natural Resources Defense Council and Gail Ruderman Feuer Senior Attorney Coalition for Clean Air Written comment: June 21, 2000
NPCA-1	Heidi K. McAuliffe Counsel, Government Affairs National Paint & Coatings Association Oral testimony: June 22, 2000
SPI	Edward H. Page President Scott-Page Incorporated Written testimony: N/A
SW-1	Doug Raymond Director of Regulatory Affairs Sherwin-Williams Written testimony: June 21, 2000
SW-2	Doug Raymond Director of Regulatory Affairs Sherwin-Williams Oral testimony: June 22, 2000
SW-3	Bob Graham Technical Director, Specialty Group of Consumer Division Sherwin-Williams Oral testimony: June 22, 2000
U. S. EPA	Deborah Jordan, Acting Director Region IX Air Division United States Environmental Protection Agency Written testimony: June 21, 2000

Comments Received During the January 26, 2001, 15-day Comment Period

Abbreviation	*Commenter*
SW-4	Doug Raymond Director of Regulatory Affairs Sherwin-Williams Written Comment: February 13, 2001
NPCA-2	Heidi McAuliffe Counsel, Spray Paint Manufacturers Committee National Paint & Coatings Association Written Comment: February 13, 2001
Lewis	Susan A. Lewis, Ph.D. Manager, EGE and PGE Panels American Chemistry Council Written Comment: February 9, 2001
EM-2	Janet Catanach Environmental Specialist Exxon-Mobil Chemical Written Comment: February 12, 2001
KOTE	Jerry Howard Technical Manager Plasti-Kote, A Valspar Company Written Comment: February 13, 2001
Avery-2	Robert J. Avery Senior Associate, Product Advocacy Eastman Chemical Written Comment: (e-mail) February 8, 2001

Summary of Comments and Agency Responses to Public Comments Received During the 45-day Comment Period

A. General Comments

1. **Comment:** There is no reason to believe that trace impurities that fall below the reporting ("*de minimis*") thresholds are generally more reactive than the products in which they are found. In some cases they will have higher reactivity; in other cases they will have lower reactivity. On the whole, there will be no air quality impact by failing to include these compounds in the calculation of product-

weighted MIR (PWMIR). Even if impurities below the "*de minimis*" thresholds had relatively high reactivity (and there is no reason to believe that they do), they are present at such low levels that there would be no air quality benefit from including them in the calculation of PWMIRs. For these reasons, a "*de minimis*" threshold of 0.1 percent should be established for calculation of PWMIRs. (ACC-1)

Agency Response: The ARB staff agrees with this comment and responds as follows. Staff analyses of the aerosol coatings data found that establishing a 0.1 percent "*de minimis*" threshold would not have any adverse impacts on air quality. Therefore, language was included in section 94522(h)(1)(E) to specify that only individual compounds (which would include impurities) present in an amount greater than or equal to 0.1 percent of the final aerosol coating formulation need to be considered in calculating the PWMIR. Any individual compound or impurity present in an amount less than 0.1 percent does not need to be considered in calculating the PWMIR.

2a. **Comment:** We cannot support the extension of the mandatory reactivity regulatory approach to other regulated consumer products as this could result in losing the regulatory compliance options such as Alternative Control Plan (ACP), restricting manufacturers' product formulation options, and eliminating certain product forms. (CSMA)

2b. **Comment:** This proposed regulation is a significant departure from the traditional mass-based regulations that the Air Resources Board has adopted to date. In addition, the new approach of mandatory reactivity-based standards for regulating emissions from aerosol coatings may not be appropriate for other types of consumer products such as personal care products that are formulated using different chemical compounds. Reactivity regulations need to be looked at on a category-by-category basis. As the science of reactivity matures and more time is available to consider whether reactivity has any applications to products other than aerosol coatings, we are certainly willing to continue our current dialogue with the ARB staff on this subject. (CTFA; SW-1; SW-2; SW-3)

Agency Response: These comments are not directed at the proposed amendments to the Aerosol Coating Regulation. However, in the interest of completeness, ARB staff responds as follows. The reactivity-based Aerosol Coating Regulation does represent a new way of controlling VOC emissions. As such, staff believes that a reactivity-based control strategy should be evaluated on a case-by-case basis and not automatically applied to other product categories. However staff does believe that the science of reactivity is sufficiently well developed to seriously consider using reactivity in other regulatory programs as appropriate and necessary.

3. **Comment:** The science of reactivity is new, highly complex and evolving. ARB-directed product reformulations for consumer products must be technologically and commercially feasible. By definition, that means that standards cannot be constantly shifting, requiring frequent product reformulations to comply. A five year period of stability will ensure industry resources are not constantly devoted to reformulate products due to MIR value fluctuations. (CTFA; NPCA-1)

Agency Response: The ARB staff agrees that aerosol coatings manufacturers should have reasonably stable limits. In response to the commenter's concern, a new provision was included in the regulation as subsection 94522(h)(2)(A). This new provision ensures "stability" of the reactivity-based limits, by specifying that no changes shall be made to the MIR values until June 1, 2007.

4. **Comment:** The Hydrocarbon Solvents Panel feels strongly that the inclusion of an adjustment factor for hydrocarbon solvents in the development of product limits is not justified based on experimental evidence, and will unfairly penalize hydrocarbon solvent users by over-estimating the contribution of these ingredients to the relative reactivity of aerosol coatings. (CMA)

Agency Response: The ARB staff disagrees with this comment and responds as follows. At present, only 3 out of over 80 hydrocarbon solvents (HCS) have experimental data available on their ability to form ozone under simulated atmospheric conditions. Because of this, HCS reactivities were estimated based on a calculation method developed by ARB staff. As detailed in the Initial Statement of Reasons, in Chapter 4 and Appendix C, this procedure allows the HCS ozone formation potential to be reliably calculated and a reactivity value assigned to HCS with similar compositions. Using this method, staff constructed a HCS classification system in which a MIR value is assigned to a group of solvents defined by a specific average boiling range. Based on the available database, the assigned MIR value is approximately $\pm$ 15 percent of the values reported by HCS manufacturers. The assigned uncertainty factor of 1.15 is appropriate and accounts for the need to "bin" HCS into groups. The ARB staff believes this factor is warranted and preserves the air quality benefit, while allowing the use of all HCS in aerosol coating formulations. We further note that no individual manufacturer is unfairly treated due to this adjustment factor because the factor applies to all HCS regardless of the manufacturer.

5. **Comment:** We fully support the mandatory reactivity proposal for aerosol coatings. (3M-1; 3M-4; NPCA-1; SW-1; SW-2; SW-3; CSMA)

Agency Response: Comment noted.

6. **Comment:** The Commenter provided documentation on the unique formulation requirements and specialized uses and functions for polyolefin adhesion promoters, and requested the addition of a new sub-category for polyolefin adhesion promoters. (3M-3)

Agency Response: After analysis of this data, the ARB staff agreed that a separate category for polyolefin adhesion promoters was appropriate to preserve the technological and commercial feasibility of the product. A new aerosol coating category was therefore proposed and approved by the Board.

7. **Comment:** We support the creation of a special sub-category for polyolefin adhesion promoters within the existing Specialty Coatings Automotive Bumper and trim Products category. (3M-2; 3M-4)

Agency Response: The ARB staff incorporates the Response to Comment 6 herein, and notes that a new category rather than a sub-category was added for polyolefin adhesion promoters. Adding a new category instead of a subcategory improves the organizational clarity of the regulation, while providing the same substantive result.

8. **Comment:** We strongly oppose the proposed amendments to the Regulation for Reducing VOC emissions from aerosol coating products. We think that it is premature to shift the way California controls emissions from aerosol coatings from a "mass-based approach" to a "reactivity-based approach." The Board should not adopt the proposed amendments. (NRDC/CCA)

Agency Response: The ARB staff disagrees with this comment. As detailed in the Executive Summary of the ISOR, the Board directed staff to develop a voluntary reactivity-based regulation for aerosol coatings at its November 19, 1998, hearing. At that time, the limits adopted represented a technological challenge for water-based aerosol coatings. By providing a reactivity-based alternative the viability of those coatings would be preserved because they are already formulated with lower reactive compounds. We also note that during development of the voluntary regulation staff concluded that the voluntary approach would not preserve the air quality benefits of the mass-based rule, and worked with the aerosol coatings industry to develop an equivalent mandatory reactivity-based regulation.

As explained in Chapter 1 of the ISOR the ARB is committed to explore the use of reactivity in our regulations and included this commitment in the 1994 State Implementation Plan for Ozone, which was subsequently approved by the U.S. EPA. This commitment was included because the magnitude of additional mass-based VOC reductions needed may be very difficult to achieve. Therefore to achieve California's air quality goals will continue to require exploring all feasible means to further reduce the effects of VOC emissions. Use of reactivity

is a feasible approach to provide additional reductions in ground level ozone concentrations. Staff also believes it is not premature to begin developing other methods to further control VOC emissions. This is because Federal law requires all areas of the State to be in attainment with the federal ozone standard by 2010. Given this attainment deadline, it is important to begin exploring and implementing innovative reduction strategies now. Finally, the ARB is convinced that the science of reactivity is ready for use in regulatory programs. Issues related to the science of reactivity are discussed in the Responses to Comments 22 through 26.

9. **Comment:** The staff's proposal fails to make a compelling argument as to why this regulatory program should be changed. (NRDC/CCA)

Agency Response: The ARB staff disagrees with this comment and incorporates the Response to Comment 8 herein. Staff believes that a compelling rationale for this reactivity-based regulation has been articulated as set forth at length in the ISOR. ARB staff would also like to add that although much progress has been made, there is still work needed to achieve California's air quality goals. Achieving these goals will require additional measures to reduce the formation of ground level ozone. In a number of coating and consumer product categories, the magnitude of additional mass-based VOC reductions needed may be very difficult to achieve. Therefore, to seek continued ozone reductions and improvement in air quality, we are committed to explore all regulatory strategies, including reactivity-based regulation of VOCs. Use of reactivity has the potential to achieve large additional reductions of ozone-forming compounds from categories where further mass control of the same magnitude is not feasible.

Because this is a new regulatory concept, however, the ARB is proceeding cautiously. The aerosol coating category was chosen for the first consumer product reactivity based regulation because it is a well-characterized, discrete category within the inventory. This will allow us to carefully monitor the implementation of the regulation to ensure that this regulatory approach is effective.

10. **Comment:** While ARB staff identifies this proposal as a pilot project, there is no term or end to it. (NRDC/CCA)

Agency Response: The ARB staff incorporates the Response to Comment 9 herein. It is true that the proposed regulation standards have no termination date. However, the regulation is a pilot project in that it establishes a methodology and program elements that could be used for additional reactivity-based regulations for other emission sources.

11. **Comment:** We believe that the reactivity limits should be more stringent. This is because aerosol coating formulations already exist that are half as reactive as the lowest proposed standard. In addition, there might be an increase in smog levels because of the MTBE phase-out in gasoline. More stringent reactivity standards may help offset this increase. (SPI)

Agency Response: The ARB staff agrees that further ozone reductions from aerosol coatings may be feasible in the future, and more stringent reactivity limits may be adopted in the future. However, the goal of this regulatory action was to set reactivity limits that were equivalent to the previously adopted mass-based VOC limits. The reactivity limits preserve both the air quality benefit of those limits and the technological and commercial feasibility of aerosol coating products.

Regarding the commenter's concern about MTBE, the ARB has already adopted regulations (the " Phase 3 California Reformulated Gasoline (CaRFG3) regulations") which phase out the use of MTBE in gasoline. The ARB is required by section 43013.1 of the Health and Safety Code to ensure that the CaRFG3 regulations maintain or improve upon emissions and air quality benefits achieved by the Phase 2 California Reformulated Gasoline regulations. Consistent with this legal requirement, the Board has determined that the CaRFG3 regulations will not result in any significant adverse air quality impacts. Mitigation is therefore not necessary because there will be no increase in smog levels as a result of the MTBE phase-out.

12. **Comment:** Our company was one the companies to utilize the ACP for the benefit of “California Air.” However, under the proposed amendments to the Aerosol Coating Regulation, the ACP will no longer be available as a compliance option. We understand that ARB is planning to revisit this issue later this summer. In an effort to ensure that this activity continues we would respectfully request that the ARB staff be directed to work on the ACP to restore this option to the industry. (SW-1; SW-2; SW-3)

Agency Response: It was necessary to temporarily eliminate the ACP as a compliance option for aerosol coatings [see section 94522(a)(6)], because the ACP is not currently designed to accommodate reactivity-based limits. However, the ARB staff is committed to work with the aerosol coating industry to restore this compliance option by developing reactivity-based provisions within the ACP for aerosol coatings. Staff expects to propose appropriate amendments to the ACP in the summer of 2001.

13. **Comment:** We support the ARB staff’s proposal to provide additional time for complying with the standards. Without this extension time, many manufacturers would not have been able to market products in many of the categories, merely because they could not get all of the work done on time (NPCA-1).

Agency Response: Comment noted. The ARB approved the proposed amendments to extend the compliance deadline from January 1, 2002, to June 1, 2002, for the general coating categories, and until January 1, 2003, for the remaining specialty coating categories.

14. **Comment:** The industry commonly refers to Chemical Abstract Services (CAS) numbers when they discuss solvents and other ingredients. The effort to create a document which allows cross-reference of the CAS numbers with the Table of MIR Values will greatly increase the user friendliness of the regulation. (NPCA-1)

Agency Response: The ARB staff agrees that a document identifying CAS numbers would be helpful. In fact, the ARB staff considered placing CAS numbers in the text of the regulation, as part of the Tables of MIR Values. However, staff found that not all compounds listed in the Tables of MIR Values have assigned CAS numbers, and, in many instances, a single CAS number (particularly for hydrocarbon solvents) could describe a number of different solvents. Therefore, it was not feasible to include CAS numbers in the text of the regulation. However, ARB staff has agreed to work with the aerosol coating industry to explore development of a nonbinding explanatory document which allows cross-reference of CAS numbers with the Tables of MIR Values, for those compounds where it is possible to do so.

B. Comments Specific to ARB Method 310 and Enforceability

15a. **Comment:** Under the proposed rule, compliance is determined using Method 310, which is being revised along with this aerosol coatings rule. Among the proposed changes, language in section 5.5 of Method 310 might be read to require formulators to identify any impurity in the raw material that exceeds 0.1 percent by weight. Because of the variation in manufacturing processes, a practical way to ensure that all impurities are quantified to a specified level would be to analyze each batch or tank load. This practice would be extremely expensive. We believe that this language was intended to provide the Executive Officer with guidance on the level of precision that should be achieved with the analytical methods specified in Method 310 rather than forcing the formulators and raw material supplies to conduct burdensome and expensive analytical work. We request that the ARB adopt a *de minimis* threshold below which trace impurities would not have to be reported. We suggest that the ARB use the *de minimis* thresholds that are specified in existing federal regulations, which are 1% for impurities or other minor constituents, and 0.1% for defined carcinogens (which are identified in 29 CFR 1910.1200(d)). These thresholds are used in every federal program where the issue of minor impurities has arisen, including the Emergency Planning and Community Right-to-Know Act, OSHA's hazard communications regulations, and U.S. EPA regulations on hazardous air

pollutants. In order to include these thresholds, appropriate language should be added to section 5.5.1 of Method 310, and to the definition of "ingredient" in section 94521(a)(35) of the regulation. (ACC-1)

15b. **Comment:** It is our understanding that the proposed regulations require determination of each VOC component with concentrations equal to greater than 0.1% by weight using Method 310. The proposed regulations also require product manufacturers and responsible parities to supply information data upon request by the Executive Officer of the CARB. Thus it may be necessary for emulsion polymer producers to develop and supply information on the content of VOC's in their emulsion polymer products. Depending on the scope of this requirement, it would be extremely burdensome to qualify every conceivable impurity that may be present in their product either through incidental chemical reactions or by virtue of their being present in raw materials supplied to the emulsion polymer industry. We are deeply concerned that if such a requirement is maintained, it will result in unnecessary expense and resources with little public health benefit. We recommend that the ARB specify *de minimis* thresholds for minor ingredients (i.e., impurities and byproducts) which may be present at trace levels. We suggest that the ARB use the *de minimis* thresholds that are specified in existing federal regulations, which are 1% for most compounds, and 0.1% for a limited subset of compounds. (EPC)

Agency Response: The ARB staff agrees that appropriate *de minimis* thresholds should be added to the regulation, as suggested by the commenters. The *de minimis* levels added by the ARB are consistent with the levels specified in federal regulations. To include these thresholds, clarifying language was added to the reporting requirements in section 94524(c)(2)(F), and to the test methods provisions of section 94526(b)(2)(C). We believe that these locations for the clarifying language are better than the specific locations suggested by the commenter (i.e., in Method 310 and the "Definitions" section of the regulation), because the locations selected by the ARB make the language more apparent to the casual reader, as compared to language buried in the body of Method 310 or the "Definitions" section. The ARB also did not use the exact language suggested by the commenter, but instead rewrote the language to improve its clarity.

16a. **Comment:** We believe that there are enforceability issues that would prevent effective enforcement of the proposed reactivity-based program. (U.S. EPA, NRDC/CCA)

16b. **Comment:** The proposed reactivity program requires considerably more resources in terms of data collection, maintenance, and analytical measurements than the mass-based VOC control programs. In addition, because of industry claims that speciated VOC data is confidential business information, public

accountability may be reduced, and there may be concerns related to Clean Air Act, section 114(c), requirements for U.S. EPA to make emission data public. (U.S. EPA)

Agency Response: The ARB staff disagrees with this comment and responds as follows. First of all, it is ARB's responsibility to enforce the regulation and the U.S. EPA will not need to provide resources for this activity. Secondly, the ARB will enforce the reactivity-based provisions of the regulation in the same manner as the mass-based provisions. Our enforcement and laboratory staffs have the necessary equipment, test methods, and expertise to conduct the required analyses. Because of this, we do not expect enforcement costs to increase. However, we are committed to vigorously enforcing the regulation and if the need should arise, the ARB will allocate more resources to ensure compliance. We also note that Method 310 was amended to allow it to be used for determining compliance with the reactivity-based standards.

Regarding recordkeeping, as with all ARB consumer products regulations, manufacturers are responsible for recordkeeping. The ARB does not collect, maintain and review records as the sole enforcement mechanism. To speed enforcement, the ARB has included a requirement that specifies that manufacturers must supply formulation data within 10 working days upon receiving notification that their product has been selected for compliance testing. However, we do not believe the regulation places an undue recordkeeping burden on manufacturers. This is because the speciated data manufacturers must supply and maintain are their product formulas, which manufacturers have readily available.

The concerns raised by U.S. EPA regarding confidential business information are not unique to a reactivity-based program. These same concerns would be applicable for mass-based VOC limits as well. The basic issue is whether aerosol coating manufactures should be allowed to claim information on their product formulations as a trade secret. In other contexts it is common for product formulation data to be claimed as a trade secret, and we do not believe that such claims reduce public accountability, or that the federal Clean Air Act requires such data to be released to the public as "emission data."

C. Comments Specific to the Tables of MIR Values

17. **Comment:** We believe that the regulation needs to provide explicit authorization for adding new compounds to the MIR list and updating existing MIR values as necessary to reflect sound science. We suggest that language be added to section 94522(h) to accomplish this. (ACC-2)

Agency Response: The language proposed by the Commenter would authorize the Executive Officer of the Air Resources Board to: (1) add new

compounds (with associated MIR values) to the Table of MIR Values, and to (2) revise the MIR value of any compound listed in the Table. The Executive Officer is authorized to take such action "… based on the best available scientific knowledge and sound engineering judgement." It is not appropriate to include such language in the text of the regulation. The ARB is authorized by Health and Safety Code sections 39600 and 39601 to adopt and amend regulations, and Administrative Procedure Act (APA) specifies a detailed procedure for making such regulatory amendments. Adding additional "authorization" to the regulation is not necessary, and could in any event not expand the ARB's authority beyond the authority that has already been granted by the Legislature. In addition, the language proposed by the Commenter purports to authorize the Executive Officer to make amendments to the Tables of MIR Values (i.e., sections 94700 and 94701, Title 17, CCR) without complying with the APA. This is not allowed under California law.

However, the ARB did do some things to partially address the Commenter's underlying concern, which seems to be that a way should be found to revise MIR values relatively quickly, as scientific knowledge progresses. In Resolution 00-22, the Board directly the Executive Officer to review the Tables of MIR Values every 18 months to determine if modifications are warranted. This review should help insure that appropriate updates occur on a regular basis. If regulatory modifications are warranted, in Resolution 00-22 the Board also authorized the Executive Officer (pursuant to Health and Safety Code sections 39515, 39516, 39600, and 39601) to adopt regulatory amendments to revise the Tables. The Executive Officer would still be required to follow the APA when adopting such amendments, but the process would be expedited by allowing the Executive Officer to more quickly adopt such revisions, without encountering scheduling delays in bringing the proposed amendments before the full Board.

18. **Comment:** The Hydrocarbon Solvent Panel suggests that ARB consider changing the definition of the aromatic bins from “100% aromatic” to “98% or greater aromatic” because trace amounts of aliphatic or other hydrocarbons may sometimes be present in these products. (CMA)

Agency Response: The ARB staff agrees with this comment and notes that section 94701 has been modified as requested by the Commenter.

19. **Comment:** Additional compounds and their respective MIR values need to be added to the Tables of MIR Values. (Avery-1)

Agency Response: The ARB staff agrees with this comment. Additional compounds and MIR values were added to the Tables of MIR Values and were circulated for public comment as part of the January 26, 2001, 15-Day Notice. As stated in this notice, the MIR values for these compounds were based on

technical work performed by Dr. William Carter and described in a report entitled: “Additions and Corrections to the SAPRC-99 Maximum Incremental Reactivity (MIR) Scale.” This report was also available for public review as part of the January 26, 2001, 15-Day Notice.

20. **Comment:** Additional changes to the nomenclature for some compounds on the Tables of MIR Values are necessary to generically describe all compounds, and to make the names more closely align with commonly used industry terminology. (Avery-1; EM-1)

Agency Response: The ARB staff agrees with this comment. These suggested changes were made to the Tables of MIR Values and were circulated for public comment as part of the January 26, 2001, 15-Day Notice.

D. Science of Photochemical Reactivity Comments

21. **Comment:** The Reactivity Scientific Advisory Committee endorses the use of the SAPRC chemical mechanism as representing the state-of-the-art in urban atmospheric chemical reaction mechanisms (CIT).

Agency Response: Comment noted. The Board approved the use of the MIR scale in the Aerosol Coating Regulation. The MIR scale is calculated using the SAPRC chemical mechanism.

22. **Comment:** Staff has not yet demonstrated that a “reactivity-based approach” works and addressed how to deal with any emission reduction shortfall that might result from using this approach. (NRDC/CCA)

Agency Response: The ARB staff disagrees with this comment. Research conducted over the past several decades has confirmed that VOCs differ in their abilities to react to form ozone, and has further confirmed that reactivity can be used as a VOC control strategy. Reactivity has already been used since 1990 in the ARB's Low Emission Vehicle/Clean Fuels regulations. To advise the ARB on reactivity issues, in 1996 the ARB formed the Reactivity Scientific Advisory Committee (RSAC), whose members are independent recognized experts in the science of reactivity. The regulatory proposal for aerosol coatings was discussed with the RSAC four times, and, upon the recommendation of the RSAC, the scientific basis of the proposal was peer reviewed by an independent scientist. The RSAC then approved the peer review, and found that the chemical mechanism from which the MIR scale was derived represented the “state-of-the-art in atmospheric chemistry mechanisms.”

The ISOR, in Chapters 2 and 4, contains detailed information documenting that a reactivity-based approach is an effective way to reduce ground level ozone concentrations. Chapter 4 of the ISOR describes the process for setting the

reactivity limits for aerosol coatings to ensure an equivalent ozone reduction as would be achieved through compliance with the mass-based limits previously adopted. Because the limits achieve an equivalent air quality benefit, no shortfall is expected to result from the amendments.

23. **Comment:** We are still in the nascent stages of understanding the relationship between hydrocarbon reactivity and ozone formation despite decades of research. (NRDC/CCA)

Agency Response: The ARB staff disagrees with this comment, incorporates the Responses to Comments 22 and 23 herein, and responds as follows. The ISOR, in Chapter 2, contains a summary of the decades of research designed to understand and improve the science of VOC reactivity. While ARB staff agrees that the science of reactivity will continue to evolve and improve, the science is sufficiently robust to expand its use in control strategies to control ozone in California. Furthermore, ARB staff worked extensively with the RSAC, comprised of leaders in the field of atmospheric chemistry, to ensure the fundamental science behind staff's work was sound.

24. **Comment:** Our principle scientific concern is whether the proposed program would actually achieve the reductions in ambient ozone pollution that are predicted based on the MIR scale. This is because MIR values are based on a particular set of assumptions which may not adequately reflect ozone reactions occurring under varying real-world atmospheric conditions. In addition, we believe that adequate studies have not been completed, and the RSAC has not addressed the question of how well MIR values predict ozone formation occurring in the ambient air. Because product VOC mass may increase by using MIR limits to comply with the rule could mean that there might be an increase of ozone formation. This is because the MIR scale assumptions may not adequately reflect varying real-world conditions. (U.S. EPA)

Agency Response: The ARB staff disagrees with this comment. Chapters 2 and 4 of the ISOR contain detailed information about the decades of reactivity research conducted which indicate that reductions in ozone occur by reducing VOC reactivity. Chapter 2 contains an abbreviated list of research conducted that validates and lends support for a reactivity-based approach. Chapter 2 also discusses the appropriateness of the MIR scale for use in California to predict ozone formation potential as opposed to other scales that have been developed. We also note that members of the RSAC (as further explained in Chapter 2) have conducted several studies on the ability of MIRs to predict ozone formation in both urban and regional domains. The results of these studies indicate that the MIR scale can be used to describe VOC reactivity in "real world" situations.

25. **Comment:** The existing air quality models do not have sufficient resolution of VOC speciation to determine the effect of a reactivity-based program. (U.S. EPA)

Agency Response: The ARB staff acknowledges that existing air quality models may not currently have sufficient resolution to account for complete VOC speciation. However, this is not a good reason to avoid implementing a reactivity-based program. Because air quality models may need further improvement does not mean that a reactivity-based control strategy is ineffective, rather it implies that more sophisticated tools need to be developed. With continued research it should be possible to develop a model to adequately measure the effect of reactivity-based controls on aerosol paints. In a related area, the air quality benefit of substituting lower reactive VOCs in gasoline for more reactive ones has been demonstrated by using an existing air quality model similar to those referred to by U.S. EPA. As explained in Chapter 2 of the ISOR, a study by McNair et al. (1992)(J. Air & Waste Manage. Assoc., 42, 174-178), used a 3-dimensional airshed model to provide relative sensitivities of pollutant formation to changes in organic compound emissions. We also note that ARB is currently funding research to improve existing air quality models.

E. Comments on the Use of Toxic Compounds in Aerosol Coatings

26. **Comment:** There is no requirement for the manufacturers to reduce the use of toxic chemicals. We are not sure how the proposed program will impact toxic emissions. (U.S. EPA, NRDC/CCA)

Agency Response: The ARB staff disagrees with this comment and responds as follows. The ISOR indicates that the use of toxic compounds is likely to decrease. As described in Chapter 10, the amounts of the toxic compounds xylene and toluene are likely to be reduced because these compounds are among the most reactive used in aerosol coatings. Because of this, the most efficient way to comply with the regulation would be to reduce the amounts of these toxic compounds. Moreover, at the hearing the Board approved amendments to completely prohibit the use of three compounds identified by the Board as Toxic Air Contaminants: methylene chloride, perchloroethylene, and trichloroethylene. Therefore, in combination, ARB staff expects an overall reduction in the use of toxic compounds in aerosol coatings as a result of this regulatory action.

27. **Comment:** The reactivity regulation is dedicated to reducing the use of highly reactive solvents and consequently, the creation of harmful ozone formation. NPCA's Spray Paint Manufacturers Committee objects to using this vehicle to ban methylene chloride. Methylene chloride is a low reactive solvent. There is already limited use of this solvent in the industry and recent findings in the scientific community indicate that it is not immuno-toxic. (NPCA-1)

Agency Response: The ARB staff disagrees with this comment. First of all, there is ample evidence to demonstrate that methylene chloride is a toxic compound. According to the 2000 National Toxicology Program Report and Integrated Risk Information System (IRIS) database of the United States Environmental Protection Agency (U.S. EPA), it is reasonably anticipated that methylene chloride is a human carcinogen. It should also be noted that the Board identified methylene chloride as a Toxic Air Contaminant in 1989 with no known threshold below which no potential adverse impacts would result.

Secondly, as part of the rulemaking process the ARB is required to mitigate any potential adverse impacts that may result from adoption of a regulation. To mitigate the potential adverse impact associated with increased use of methylene chloride, originally, a "no new use" provision was proposed for methylene chloride. This was because a risk analysis conducted by ARB staff indicated that increased use of methylene chloride in aerosol coating products could be a health hazard (see Chapter 10 and Appendix G of the ISOR). In the existing regulation, to mitigate the potential adverse impact, methylene chloride is counted as a VOC and an overall reduction in VOCs (including a likely reduction in methylene chloride use) would occur if manufacturers reformulate their products to meet mass limits. Such a reduction in methylene chloride use is less likely to occur under a reactivity-based approach, because methylene chloride is both relatively low in reactivity and inexpensive. These factors would provide an incentive for its continued use--and possibly even an increase in use --in order to meet reactivity-based standards. Therefore, the Board found that to completely mitigate the potential adverse impact, a complete prohibition on the use of methylene chloride was appropriate. Resolution 00-22 contains findings that address this issue in more detail.

This proposal also "levels the playing field" for all manufactures, thereby avoiding any economic advantage that may be provided to manufacturers who currently use methylene chloride and would be allowed to continue using it indefinitely under a "no new or increase use" provision. Staff also notes that the proposed prohibition of methylene chloride use is consistent with recent Board actions on the use of this compound in other consumer products.

28. **Comment:** A mass-based approach to VOC reduction in coatings will also give greater protection against identified and not-yet-identified toxic air contaminants. Numerous VOCs have been identified as toxic air contaminants but many more

are under investigation. A mass-based approach requires an overall reduction in VOC content, and thus an inherent reduction in toxics. Though the staff report repeatedly notes that there may be a reduction in the use of toluene and xylene, there is no requirement for the manufacturers to reduce the use of these toxic chemicals. (NRDC/CCA)

Agency Response: The ARB staff disagrees with this comment, and incorporates the responses to Comments 27 and 28. Because of toxicity concerns, the ARB prohibited the use of three VOCs that have the greatest potential to pose a health threat to the public (methylene chloride, perchloroethylene and trichloroethylene).

Also, mass-based limits do not necessarily discourage the use of toxic compounds, particularly xylene and toluene. In fact, ARB staff concluded that mass-based limits might lead to increased use of these compounds. This is because as VOC content is reduced to meet mass-based limits, manufacturers' options of maintaining the overall product solvency are also reduced. To counteract this problem, adding amounts of very good solvents such as xylene and toluene would allow the product to retain the desired solvency--even with an overall VOC content reduction. Thus, using a mass-based approach for aerosol coatings was likely to lead to an increased use of xylene and toluene. With a reactivity-based approach a reduction in the use of these toxic compounds is more likely. Moreover, if research reveals that additional VOCs have potential toxic impacts, the ARB will take appropriate action to mitigate adverse impacts from using those compounds.

Summary of Comments and Agency Responses to Public Comments Received During the January 26, 2001, 15 Day Public Comment Period

29. **Comment:** We support the proposed modifications to the Aerosol Coatings Regulation that were circulated for public comment during the 15-Day Notice. (NPCA-2; SW-4; KOTE)

Agency Response: Comment noted.

30. **Comment:** Several compounds were not added and several nomenclature changes were not made to the Tables of MIR Values that were requested during the 45-Day Comment Period. (Avery-2; Lewis; EM-2;)

Agency Response: The ARB staff agrees with this comment. Staff inadvertently failed to make all of the requested changes to the Table of MIR Values for Compounds during the first 15-Day comment period. In response to this comment, the requested changes were made to the Table of MIR Values for Compounds, and were circulated for a comment period of 15 days beginning

March 15, 2001, via a “Supplemental Notice of Public Availability of Modified Text.” No Comments were received during the supplemental 15-day comment period.