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Part IV

Environmental Protection Agency

40 CFR Parts 51 and 59

**National Volatile Organic Compound
Emission Standards for Aerosol Coatings;
Proposed Rule**

**ENVIRONMENTAL PROTECTION
AGENCY**
40 CFR Parts 51 and 59

[EPA-HQ-OAR-2006-0971; FRL-8336-5]

RIN 2060-AN69

**National Volatile Organic Compound
Emission Standards for Aerosol
Coatings**
AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: This action proposes a national reactivity-based volatile organic compound (VOC) emissions regulation for the aerosol coatings (aerosol spray paints) category under section 183(e) of the Clean Air Act (CAA). The proposed standards implement section 183(e) of the CAA, as amended in 1990, which requires the Administrator to control VOC emissions from certain categories of consumer and commercial products for purposes of minimizing VOC emissions contributing to ozone formation and causing non-attainment. This regulation will establish a nationwide reactivity-based standard for aerosol coatings. States have promulgated rules for the aerosol coatings category based upon reductions of VOC by mass; however, the Agency believes that a national rule based upon the relative reactivity approach may achieve more reduction in ozone formation than can be achieved by a mass-based approach for this specific product category. EPA believes that this rule will better control a product's contribution to ozone formation by encouraging the use of less reactive VOC ingredients, rather than treating all VOC in a product alike through the traditional mass-based approach. We are also proposing to revise EPA's regulatory definition of VOC exempt compounds for purposes of this regulation in order to account for all the reactive compounds in aerosol coatings that contribute to ozone formation. Therefore, compounds that would not be VOC under the otherwise applicable definition will count towards a product's reactivity limits under this proposed regulation. The initial listing of product categories and schedule for regulation was published on March 23, 1995 (60 FR 15264). This proposed action announces EPA's final decision to list aerosol coatings for regulation under group III of the consumer and commercial product category for which regulations are mandated under section 183 (e) of the Act.

DATES: *Comments.* Written comments on the proposed regulation must be received by EPA by August 15, 2007, unless a public hearing is requested by July 26, 2007. If a hearing is requested, written comments must be received by August 30, 2007.

Public Hearing. If anyone contacts EPA requesting to speak at a public hearing concerning the proposed regulation by July 26, 2007, we will hold a public hearing on July 31, 2007.

ADDRESSES: *Comments.* Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2006-0971, by one of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the on-line instructions for submitting comments.

- *E-mail:* a-and-r-docket@epa.gov.

- *Fax:* (202) 566-1741.

- *Mail:* Air and Radiation Docket, Environmental Protection Agency, Mailcode 6102T, 1200 Pennsylvania Avenue, NW., Washington, DC 20460. Please include a total of two copies. We request that a separate copy also be sent to the contact person identified below (see **FOR FURTHER INFORMATION CONTACT**). In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB), Attn: Desk Officer for EPA, 725 17th St., NW., Washington, DC 20503.

- *Hand Delivery:* EPA Docket Center, Public Reading Room, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC 20460. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to the applicable docket. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at <http://www.regulations.gov>, including any personal information provided, unless the comment includes information claimed to be confidential business information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through www.regulations.gov or e-mail. The www.regulations.gov Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through www.regulations.gov, your e-mail address will be automatically captured

and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

Public Hearing. If a public hearing is held, it will be held at 10 a.m. on July 31, 2007 at Building C on the EPA campus in Research Triangle Park, NC, or at an alternate site nearby. Persons interested in presenting oral testimony must contact Ms. Dorothy Apple, U.S. EPA, Office of Air Quality Planning and Standards, Sector Policies and Programs Division, Natural Resources and Commerce Group (E143-03), Research Triangle Park, North Carolina 27711, telephone number: (919) 541-4487, fax number (919) 541-3470, e-mail address: apple.dorothy@epa.gov, no later than July 26, 2007 in the **Federal Register**. Persons interested in attending the public hearing must also call Ms. Apple to verify the time, date, and location of the hearing. If no one contacts Ms. Apple by July 26, 2007 in the **Federal Register** with a request to present oral testimony at the hearing, we will cancel the hearing.

Docket: All documents in the docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at the EPA Docket Center, Public Reading Room, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC 20460. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1742, and the telephone number for the Air Docket is (202) 566-1744.

FOR FURTHER INFORMATION CONTACT: For information concerning the aerosol coatings rule, contact Ms. J. Kaye Whitfield, U.S. EPA, Office of Air Quality Planning and Standards, Sector

Policies and Programs Division, Natural Resources and Commerce Group (E143-03), Research Triangle Park, North Carolina 27711, telephone number: (919) 541-2509, fax number (919) 541-3470, e-mail address: whitfield.kaye@epa.gov. For information concerning the CAA section 183(e) consumer and commercial products program, contact Mr. Bruce Moore, U.S. EPA, Office of Air Quality Planning and Standards, Sector Policies and Programs

Division, Natural Resources and Commerce Group (E143-03), Research Triangle Park, North Carolina 27711, telephone number: (919) 541-5460, fax number (919) 541-3470, e-mail address: moore.bruce@epa.gov.

SUPPLEMENTARY INFORMATION: *Entities Potentially Affected by this Action.* The entities potentially regulated by the proposed regulation encompass aerosol coatings operations. This includes

manufacturers, processors, wholesale distributors, or importers of aerosol coatings for sale or distribution in the United States, or manufacturers, processors, wholesale distributors, or importers that supply the entities listed with aerosol coatings for sale or distribution in interstate commerce in the United States. The entities potentially affected by this action include:

Category	NAICS code ^a	Examples of regulated entities
Paint and coating manufacturing	32551	Manufacturing of lacquers, varnishes, enamels, epoxy coatings, oil and alkyd vehicle, plastisols, polyurethane, primers, shellacs, stains, water repellent coatings.
All other miscellaneous chemical production and preparation manufacturing.	325998	Aerosol can filling, aerosol packaging services.

^a <http://www.census.gov/epcd/www/naics.html>.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this action. To determine whether you would be affected by this action, you should examine the applicable industry description in section I.E of this notice. If you have any questions regarding the applicability of this action to a particular entity, consult the appropriate EPA contact listed in the **FOR FURTHER INFORMATION CONTACT** section of this notice.

Preparation of Comments. Do not submit information containing CBI to EPA through www.regulations.gov or e-mail. Send or deliver information identified as CBI only to the following address: Mr. Roberto Morales, OAQPS Document Control Officer (C404-02), U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711, Attention: Docket ID EPA-HQ-OAR-2006-0971. Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD ROM that you mail to EPA, mark the outside of the disk or CD ROM as CBI and then identify electronically within the disk or CD ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

World Wide Web (WWW). In addition to being available in the docket, an electronic copy of this proposed action will also be available on the Worldwide

Web (WWW) through the Technology Transfer Network (TTN). Following signature, a copy of the proposed action will be posted on the TTN's policy and guidance page for newly proposed or promulgated rules at the following address: <http://www.epa.gov/ttn/oarpg/>. The TTN provides information and technology exchange in various areas of air pollution control.

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I. Background

A. The Ozone Problem

Ground-level ozone, a major component of smog, is formed in the atmosphere by reactions of VOC and oxides of nitrogen in the presence of sunlight. The formation of ground-level ozone is a complex process that is affected by many variables.

Exposure to ground-level ozone is associated with a wide variety of human health effects, as well as agricultural crop loss, and damage to forests and ecosystems. Controlled human exposure studies show that acute health effects are induced by short-term (1 to 2 hour) exposures (observed at concentrations as low as 0.12 parts per million (ppm)), generally while individuals are engaged in moderate or heavy exertion, and by prolonged (6 to 8 hour) exposures to ozone (observed at concentrations as low as 0.08 ppm and possibly lower), typically while individuals are engaged

in moderate exertion. Transient effects from acute exposures include pulmonary inflammation, respiratory symptoms, effects on exercise performance, and increased airway responsiveness. Epidemiological studies have shown associations between ambient ozone levels and increased susceptibility to respiratory infection, increased hospital admissions and emergency room visits. Groups at increased risk of experiencing elevated exposures include active children, outdoor workers, and others who regularly engage in outdoor activities. Those most susceptible to the effects of ozone include those with preexisting respiratory disease, children, and older adults. The literature suggests the possibility that long-term exposures to ozone may cause chronic health effects (e.g., structural damage to lung tissue and accelerated decline in baseline lung function).

B. Statutory and Regulatory Background

Under section 183(e) of the CAA, EPA conducted a study of VOC emissions from the use of consumer and commercial products to assess their potential to contribute to levels of ozone that violate the National Ambient Air Quality Standards (NAAQS) for ozone, and to establish criteria for regulating VOC emissions from these products. Section 183(e) of the CAA directs EPA to list for regulation those categories of products that account for at least 80 percent of the VOC emissions, on a reactivity-adjusted basis, from consumer and commercial products in areas that violate the NAAQS for ozone (i.e., ozone nonattainment areas), and to divide the list of categories to be regulated into four groups.

EPA published the initial list in the **Federal Register** on March 23, 1995 (60 FR 15264). In that notice, EPA stated that it may amend the list of products for regulation, and the groups of product categories, in order to achieve an effective regulatory program in accordance with the Agency's discretion under CAA section 183(e). EPA has revised the list several times. Most recently, in May 2006, EPA revised the list to add one product category, portable fuel containers, and to remove one product category, petroleum dry cleaning solvents. See 71 FR 28320 (May 16, 2006). The aerosol spray paints (aerosol coatings) category currently is listed for regulation as part of Group III of the CAA section 183(e) list.

CAA section 183(e) directs EPA to regulate Consumer and Commercial Products using "best available controls" (BAC). CAA section 183(e)(1)(A) defines BAC as "the degree of emissions

reduction that the Administrator determines, on the basis of technological and economic feasibility, health, environmental, and energy impacts, is achievable through the application of the most effective equipment, measures, processes, methods, systems or techniques, including chemical reformulation, product or feedstock substitution, repackaging, and directions for use, consumption, storage, or disposal." CAA section 183(e) also provides EPA with authority to use any system or systems of regulation that EPA determines is the most appropriate for the product category. Under CAA section 183(e)(4), EPA can impose "any system or systems of regulation as the Administrator deems appropriate, including requirements for registration and labeling, self-monitoring and reporting, prohibitions, limitations, or economic incentives (including marketable permits and auctions of emissions rights) concerning the manufacture, processing, distribution, use, consumption or disposal of the product." Under these provisions, EPA has previously issued national regulations for architectural coatings, autobody refinishing coatings, consumer products, and portable fuel containers.^{1, 2, 3, 4, 5}

For any category of consumer or commercial products, the Administrator may issue control techniques guidelines (CTGs) in lieu of national regulations if the Administrator determines that such guidance will be substantially as effective as regulations in reducing emissions of volatile organic compounds which contribute to ozone levels in areas which violate the national ambient air quality standard for ozone. In many cases, CTGs can be effective regulatory approaches to reduce emissions of VOC in nonattainment areas because of the nature of the specific product and the uses of such product. A critical distinction between a national rule and a CTG is that a CTG may include provisions that affect the users of the products. For other product categories, such as wood furniture coatings and

shipbuilding coatings, EPA has previously determined that, under CAA section 183(e)(3)(C), a CTG would be substantially as effective as a national rule and, therefore, issued CTGs to provide guidance to States for development of appropriate State regulations.

For the category of aerosol coatings, EPA has determined that a national rule applicable nationwide is the best system of regulation to achieve necessary VOC emission reductions from this type of product. Aerosol coatings are typically used in relatively small amounts by consumers and others on an occasional basis and at varying times and locations. Under such circumstances, reformulation of the VOC content of the products is a more feasible way to achieve VOC emission reductions, rather than through a CTG approach that would only affect a smaller number of relatively large users. Aerosol coatings regulations are already in place in three States (California, Oregon, and Washington), and other States are considering developing regulations for these products. For the companies that market aerosol coatings in different States, trying to fulfill the differing requirements of State rules may create administrative, technical, and marketing problems. A Federal rule is expected to provide some degree of consistency, predictability, and administrative ease for the industry. A national rule also helps States reduce compliance problems associated with noncompliant coatings being transported into nonattainment areas from neighboring areas and neighboring States. A national rule will also enable States to obtain needed VOC emission reductions from this sector in the near term, without having to expend their limited resources to develop similar rules in each State.⁶

C. What Is Photochemical Reactivity?

There are thousands of individual species of VOC chemicals that can participate in a series of reactions involving nitrogen oxides (NO_x) and the energy from sunlight, resulting in the formation of ozone. The impact of a given species of VOC on formation of ground-level ozone is sometimes referred to as its "reactivity." It is generally understood that not all VOC are equal in their effects on ground-level ozone formation. Some VOC react extremely slowly and changes in their emissions have limited effects on ozone pollution episodes. Some VOC form ozone more quickly than other VOCs, or they may form more ozone than other

¹ National Volatile Organic Compound Emission Standards for Architectural Coatings" 63 FR 48848, (September 11, 1998).

² "National Volatile Organic Compound Emission Standards for Automobile Refinish Coatings" 63 FR 48806, (September 11, 1998).

³ "Consumer and Commercial Products: Schedule for Regulation" 63 FR 48792, (September 11, 1998).

⁴ "National Volatile Organic Compound Emission Standards for Consumer Products" 63 FR 48819, (September 11, 1998).

⁵ "National Volatile Organic Compound Emission Standards for Portable Fuel Containers" 72 FR 8428, (February 26, 2007).

⁶ *ALARM Caucus v. EPA*, 215 F.3d 61,76 (D.C. Cir. 2000), cert. denied, 532 U.S. 1018 (2001).

VOC. Other VOC not only form ozone themselves, but also act as catalysts and enhance ozone formation from other VOC. By distinguishing between more reactive and less reactive VOC, however, EPA believes that it may be possible to develop regulations that will decrease ozone concentrations further or more efficiently than by controlling all VOC equally.

Assigning a value to the reactivity of a specific VOC species is a complex undertaking. Reactivity is not simply a property of the compound itself; it is a property of both the compound and the environment in which the compound is found. Therefore, the reactivity of a specific VOC varies with VOC:NO_x ratios, meteorological conditions, the mix of other VOC in the atmosphere, and the time interval of interest. Designing an effective regulation that takes account of these interactions is difficult. Implementing and enforcing such a regulation requires an extra burden for both industry and regulators, as those impacted by the rule must characterize and track the full chemical composition of VOC emissions rather than only having to track total VOC content as is required by traditional mass-based rules. EPA's September 13, 2005 final rule⁷ to approve a comparable reactivity-based aerosol coating rule as part of the California State Implementation Plan for ozone contains additional background information on photochemical reactivity. Recently, EPA issued interim guidance to States regarding the use of VOC reactivity information in the development of ozone control measures.⁸

1. What Research Has Been Conducted in Reactivity?

Much of the initial work on reactivity scales was funded by the California Air Resources Board (CARB), which was interested in comparing the reactivity of emissions from different alternative fueled vehicles. In the late 1980s, CARB provided funding to William P. L. Carter at the University of California to develop a reactivity scale. Carter investigated 18 different methods of ranking the reactivity of individual VOC in the atmosphere using a single-cell trajectory model with a state-of-the-art

chemical reaction mechanism.⁹ Carter suggested three scales for further consideration:

i. Maximum Incremental Reactivity (MIR) scale—an ozone yield scale derived by adjusting the NO_x emissions in a base case to yield the highest incremental reactivity of the base reactive organic gas mixture.

ii. Maximum Ozone Incremental Reactivity (MOIR) scale—an ozone yield scale derived by adjusting the NO_x emission in a base case to yield the highest peak ozone concentration.

iii. Equal Benefit Incremental Reactivity (EBIR) scale—an ozone yield scale derived by adjusting the NO_x emissions in a base case scenario so VOC and NO_x reductions are equally effective in reducing ozone.

Carter concluded that, if only one scale is used for regulatory purposes, the maximum incremental reactivity (MIR) scale is the most appropriate.¹⁰ The MIR scale is defined in terms of environmental conditions where ozone production is most sensitive to changes in hydrocarbon emissions and, therefore, represents conditions where hydrocarbon controls would be the most effective. CARB therefore used the MIR scale to establish fuel-neutral VOC emissions limits in its low-emitting vehicle and alternative fuels regulation.^{11, 12} Subsequently, Carter has updated the MIR scale several times as the chemical mechanisms in the model used to derive the scale have evolved with new scientific information. CARB incorporated a 1999 version of the MIR scale in its own aerosol coatings rule. The latest revision to the MIR scale was issued in 2003.

In addition to Carter's work, there have been other attempts to create reactivity scales. One such effort is the work of R.G. Derwent and coworkers, who have published articles on a scale called the photochemical ozone creation potential (POCP) scale.^{13, 14} This scale

was designed for the emissions and meteorological conditions prevalent in Europe. The POCP scale is generally consistent with that of Carter, although there are some differences because it uses a different model, chemical mechanism, and emission and meteorological scenarios. Despite these differences, there is a good correlation of $r^2=0.9$ between the results of the POCP and the MIR scales¹².

As CARB worked to develop reactivity-based regulations in California, EPA began to explore the implications of applying reactivity scales in other parts of the country. In developing its regulations, CARB has maintained that the MIR scale is the most appropriate metric for application in California, but cautions that its research has focused on California atmospheric conditions and that the suitability of the MIR scale for regulatory purposes in other areas has not been demonstrated. In particular, specific concerns have been raised about the suitability of using the MIR scale in relation to multi-day stagnation or transport scenarios or over geographic regions with very different VOC:NO_x ratios than those of California.

In 1998, EPA participated in the formation of the Reactivity Research Working Group (RRWG), which was organized to help develop an improved scientific basis for reactivity-related regulatory policies.¹⁵ All interested parties were invited to participate. Since that time, representatives from EPA, CARB, Environment Canada, States, academia, and industry have met in public RRWG meetings to discuss and coordinate research that would support this goal.

The RRWG has organized a series of research efforts to explore:

- i. The sensitivity of ozone to VOC mass reductions and changes in VOC composition under a variety of environmental conditions;
- ii. The derivation and evaluation of reactivity scales using photochemical airshed models under a variety of environmental conditions;
- iii. The development of emissions inventory processing tools for exploring reactivity-based strategies; and
- iv. The fate of VOC emissions and their availability for atmospheric reactions.

This research has led to a number of findings that increase our confidence in

⁷ "Revisions to the California State Implementation Plan and Revision to the Definition of Volatile Organic Compounds (VOC)—Removal of VOC Exemptions for California's Aerosol Coating Products Reactivity-based Regulation" 70 FR 53930, (September 13, 2005).

⁸ "Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans" 70 FR 54046, (September 13, 2005).

⁹ Carter, W. P. L. (1994) "Development of ozone reactivity scales for organic gases," *J. Air Waste Manage. Assoc.*, 44: 881–899.

¹⁰ "Initial Statement of Reasons for the California Aerosol Coatings Regulation, California Air Resources Board," 2000.

¹¹ California Air Resources Board "Proposed Regulations for Low-Emission Vehicles and Clean Fuels—Staff Report and Technical Support Document," State of California, Air Resources Board, P.O. Box 2815, Sacramento, CA 95812, August 13, 1990.

¹² California Air Resources Board "Proposed Regulations for Low-Emission Vehicles and Clean Fuels—Final Statement of Reasons," State of California, Air Resources Board, July 1991.

¹³ Derwent, R.G., M.E. Jenkin, S.M. Saunders and M.J. Pilling (2001) "Characterization of the Reactivities of Volatile Organic Compounds Using a Master Chemical Mechanism," *J. Air Waste Management Assoc.*, 51: 699–707.

¹⁴ Derwent, R.G., M.E. Jenkin, S.M. Saunders and M.J. Pilling (1998) "Photochemical Ozone Creation Potentials for Organic Compounds in Northwest Europe Calculated with a Master Chemical Mechanism," *Atmos. Env.*, 32(14/15):2429–2441.

¹⁵ See <http://www.narsto.org/section.src?SID=10>.

the ability to develop regulatory approaches that differentiate between specific VOC on the basis of relative reactivity. The first two research objectives listed above were explored in a series of three parallel modeling studies that resulted in four reports and one journal article.^{16, 17, 18, 19, 20} EPA commissioned a review of these reports to address a series of policy-relevant science questions.²¹ In 2007, an additional peer review was commissioned by EPA to assess the appropriateness of basing a national aerosol coatings regulation on reactivity. Generally, the peer reviews support the appropriateness of the use of the box-model based MIR metric nationwide for the aerosol coatings category. The results are available in the rulemaking docket.

The results of the RRWG-organized study and the subsequent reviews suggest that there is good correlation between different relative reactivity metrics calculated with photochemical airshed models, regardless of the choice of model, model domain, scenario, or averaging times. Moreover, the scales calculated with photochemical airshed models correlate relatively well with the MIR metric derived with a single cell, one-dimensional box model. Prior to the RRWG-organized studies, little analysis of the robustness of the box-model derived MIR metric and its applicability to environmental conditions outside California had been conducted. Although these studies were not specifically designed to test the robustness of the box-model derived MIR metrics, the results suggest that the MIR metric is relatively robust.

¹⁶ Carter, W.P.L., G. Tonnesen, and G. Yarwood (2003) Investigation of VOC Reactivity Effects Using Existing Regional Air Quality Models, Report to American Chemistry Council, Contract SC-20.0-UCR-VOC-RRWG, April 17, 2003.

¹⁷ Hakami, A., M.S. Bergin, and A.G. Russell (2003) Assessment of the Ozone and Aerosol Formation Potentials (Reactivities) of Organic Compounds over the Eastern United States, Final Report, Prepared for California Air Resources Board, Contract No. 00-339, January 2003.

¹⁸ Hakami, A., M.S. Bergin, and A.G. Russell (2004a) Ozone Formation Potential of Organic Compounds in the Eastern United States: A Comparison of Episodes, Inventories, and Domains, *Environ. Sci. Technol.* 2004, 38, 6748-6759.

¹⁹ Hakami, A., M. Arhami, and A.G. Russell (2004b) Further Analysis of VOC Reactivity Metrics and Scales, Final Report to the U.S. EPA, Contract #4D-5751-NAEX, July 2004.

²⁰ Arunachalam S., R. Mathur, A. Holland, M.R. Lee, D. Olerud, Jr., and H. Jeffries (2003) Investigation of VOC Reactivity Assessment with Comprehensive Air Quality Modeling, Prepared for U.S. EPA, GSA Contract # GS-35F-0067K, Task Order ID: 4TCG68022755, June 2003.

²¹ Derwent, R.G. (2004) Evaluation and Characterization of Reactivity Metrics, Final Draft, Report to the U.S. EPA, Order No. 4D-5844-NATX, November 2004.

D. Role of Reactivity in VOC/Ozone Regulations

Historically, EPA's general approach to regulation of VOC emissions has been based upon control of total VOC by mass, without distinguishing between individual species of VOC. EPA considered the regulation of VOC by mass to be the most effective and practical approach based upon the scientific and technical information available when EPA developed its VOC control policy.

EPA issued the first version of its VOC control policy in 1971, as part of EPA's State Implementation Plan (SIP) preparation guidance.²² In that guidance, EPA emphasized the need to reduce the total mass of VOC emissions, but also suggested that substitution of one compound for another might be useful when it would result in a clearly evident decrease in reactivity and thus tend to reduce photochemical oxidant formation. This latter statement encouraged States to promulgate SIPs with VOC emission substitution provisions similar to the Los Angeles County Air Pollution Control District's (LACAPCD) Rule 66, which allowed some VOC that were believed to have low to moderate reactivity to be exempted from control. The exempt status of many of those VOC was questioned a few years later, when research results indicated that, although some of those compounds do not produce much ozone close to the source, they may produce significant amounts of ozone after they are transported downwind from urban areas.

In 1977, further research led EPA to issue a revised VOC policy under the title "Recommended Policy on Control of Volatile Organic Compounds," (42 FR 35314, July 8, 1977), offering its own, more limited list of exempt organic compounds. The 1977 policy identified four compounds that have very low photochemical reactivity and determined that their contribution to ozone formation and accumulation could be considered negligible. The policy exempted these "negligibly reactive" compounds from VOC emissions limitations in programs designed to meet the ozone NAAQS. Since 1977, the EPA has added other compounds to the list of negligibly reactive compounds based on new information as it has been developed. In 1992, the EPA adopted a formal regulatory definition of VOC for use in SIP, which explicitly excludes

²² "Requirements for Preparation, Adoption and Submittal of Implementation Plans", Appendix B, 36 FR 15495, (August 14, 1971).

compounds that have been identified as negligibly reactive (40 CFR 51.100(s)).

To date, EPA has exempted 54 compounds or classes of compounds in this manner. In effect, EPA's current VOC exemption policy has generally resulted in a two bin system in which most compounds are treated equally as VOC and are controlled and a separate smaller group of compounds are treated as negligibly reactive and are exempt from VOC control.²³ This approach was intended to encourage the reduction of emissions of all VOC that participate in ozone formation. From one perspective, it appears that this approach has been relatively successful. EPA estimates that, between 1970 and 2003, VOC emissions from man-made sources nationwide declined by 54 percent. This decline in VOC emissions has helped to decrease average ozone concentration by 29 percent (based on 1-hour averages) and 21 percent (based on 8-hour averages) between 1980 and 2003. These reductions occurred even though, between 1970 and 2003, population, vehicle miles traveled, and gross domestic product rose 39 percent, 155 percent and 176 percent respectively.²⁴

On the other hand, some have argued that a reactivity-based approach for reducing VOC emissions would be more effective than the current mass-based approach. One group of researchers conducted a detailed modeling study of the Los Angeles area and concluded that, compared to the current approach, a reactivity-based approach could achieve the same reductions in ozone concentrations at significantly less cost or, for a given cost, could achieve a significantly greater reduction in ozone concentrations.²⁵ Although the traditional approach to VOC control focused on reducing the overall mass of emissions may be adequate in some areas of the country, EPA's recent guidance on control of VOC in ozone SIPs recognizes that approaches to VOC control that differentiate between VOC

²³ For some analytical purposes, EPA has distinguished between VOC and "highly reactive" VOC, such as in the Agency's initial evaluation of consumer products for regulation. See, "Final Listing," 63 FR 48792, 48795-6 (Sept. 11, 1998) (explaining EPA's approach); see also, *ALARM Caucus v. EPA*, 215 F. 3d 61, 69-73 (D.C. Cir. 2000), cert. denied, 532 U.S. 1018 (2001) (approving EPA's approach as meeting the requirements of CAA section 183(e)).

²⁴ "Latest Findings on National Air Quality: 2002 Status and Trends," EPA 454/K-03-001, (August 2003); and "The Ozone Report Measuring Progress through 2003," EPA 454/K-04-001, (April 2004); Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

²⁵ A. Russell, J. Milford, M. S. Bergin, S. McBride, L. McNair, Y. Yang, W. R. Stockwell, B. Croes, "Urban Ozone Control and Atmospheric Reactivity of Organic Gases," *Science*, 269: 491-495, (1995).

based on relative reactivity are likely to be more effective and efficient under certain circumstances.²⁶ In particular, reactivity-based approaches are likely to be important in areas for which aggressive VOC control is a key strategy for reducing ozone concentrations. Such areas include:

- Areas with persistent ozone nonattainment problems;
- Urbanized or other NO_x-rich areas where ozone formation is particularly sensitive to changes in VOC emissions;
- Areas that have already implemented VOC RACT measures and need additional VOC emission reductions.

In these areas, there are a variety of possible ways of addressing VOC reactivity in the SIP development process, including:

- Developing accurate, speciated VOC emissions inventories.
- Prioritizing control measures using reactivity metrics.
- Targeting emissions of highly-reactive VOC compounds with specific control measures.
- Encouraging VOC substitution and composition changes using reactivity-weighted emission limits.

The CARB aerosol coatings rule is an example of this last application of the concept of reactivity. CARB's reactivity-based rule encouraged the use of compounds that were less effective at producing ozone. It contained limits for aerosol coatings expressed as grams of ozone formed per gram of product instead of the more traditional limits expressed as percent VOC. EPA approved CARB's aerosol coatings rule as part of the California SIP for ozone. EPA's national aerosol coatings rule builds largely upon CARB's efforts to regulate this product category based upon relative reactivity.

E. The Aerosol Coating Industry

Aerosol coatings include all coatings that are specially formulated and packaged for use in pressurized cans. They are used by both professional and by do-it-yourself (DIY) consumers. The DIY segment accounts for approximately 80 percent of all sales. The remainder of aerosol coatings is sold for industrial maintenance and original equipment manufacturer use. Aerosol coatings are used for a number of applications including small domestic coating jobs, field and construction site marking, and touch-up of marks and scratches in paintwork of automobiles, appliances and machinery.

The aerosol coatings industry includes the formulators and manufacturers of the concentrated product. These manufacturers may package the product or they may use toll fillers (processors). These toll fillers may work not only with the large manufacturers, but for other coating manufacturers who do not have the specialized equipment to fill aerosol containers. The fillers may then supply the product to coating dealers, home supply stores, distributors, company-owned stores, and industrial customers.

An aerosol consists of a gas in which liquid or solid substances may be dispensed. Aerosol coatings are pressurized coatings that, like other coatings, consist of pigments and resins and solvents. However, aerosol coatings also contain a propellant that dispenses the product ingredients. A controlled amount of propellant in the product vaporizes as it leaves the container, creating the aerosol spray. The combination of product and propellant is finely tuned to produce the correct concentration and spray pattern for an effective product.

Aerosol coatings can be packaged in disposable cans for hand-held applications or for use in specialized equipment in ground traffic/marketing applications. As with other coatings, aerosol coatings are available in both solvent-based and water-based formulations.

In developing the proposed national rule for aerosol coatings, EPA is using the same coating categories, and the same definitions for those categories, previously identified by CARB in its comparable regulation for aerosol coatings. We believe these categories adequately categorize the industry and encompass the range of products included in our own analysis of this category that we conducted in preparing the Report to Congress (EPA-453/R-94-066-A). Use of the same definitions and categories has the added benefit of providing regulated entities with consistency between the CARB and national rules. The categories we propose include six general categories and 30 specialty categories. Based on a survey of aerosol coating manufacturers conducted by CARB in 1997, VOC emissions from the six general categories together with the specialty category of Ground Traffic/Marking Coatings account for approximately 85 percent of the ozone formed as a result of the use of aerosol coatings. These categories are defined in this proposed regulation and are described in more detail in the docket to this rulemaking.

There are currently no national regulations addressing VOC emissions

from aerosol coatings. California, Oregon and Washington are the only States that currently regulate aerosol coating products and Oregon's and Washington's rules are identical to the Tier 1 VOC mass-based limits developed by CARB that became effective in 1996. Unlike other EPA or State regulations and previous CARB regulations for aerosol coatings that regulate VOC ingredients by mass in the traditional approach, the current California regulation for aerosol coatings is designed to limit the ozone formed from VOC emissions from aerosol coatings by establishing limits on the reactivity of the cumulative VOC ingredients of such coatings. A more thorough discussion of the reactivity approach and the proposed reactivity limits are presented later in this preamble (section IV.D).

II. Summary of Proposed Standards

A. Applicability of the Standards and Regulated Entities

The proposed Aerosol Coatings Reactivity Rule (ACRR) will apply to manufacturers, processors, wholesale distributors, or importers of aerosol coatings used by both the general population (i.e., the "Do It Yourself" market) and industrial applications (e.g., at original equipment manufacturers and other industrial sites). This regulation will also apply to distributors if those distributors are responsible for any of the labeling of the aerosol products. The proposed rule includes an exemption from the limits in Table 1 of subpart E of the rule for those manufacturers that manufacture very limited amounts of aerosol coatings, i.e., products with a total VOC content by mass of no more than 7,500 kilograms of VOC per year in the aggregate for all products. EPA notes that an exemption under EPA's national rule for aerosol coatings under section 183(e) does not alter any requirements under any applicable State or local regulations.

B. Regulated Pollutant

The regulated pollutants under this proposed regulation are VOC, as that term is defined in 40 CFR 51.100(s). However, the listed exempt compounds that are normally excluded from the definition of VOC in 40 CFR 51.100(s)(1) will be regulated as VOC for purposes of this regulation. Because all of these compounds contribute to ozone formation, we are proposing to amend the regulatory definition of VOC for purposes of this rule. While the regulated pollutants will be VOCs, the emission limits in the standard will be expressed in terms of weight of ozone generated from the VOC ingredients per

²⁶ "Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans," 70 FR 54046, September 13, 2005.

weight of coating material, rather than the traditional weight of VOC ingredients per weight or volume of product. We believe that this approach will allow us to reduce the overall amount of ozone that results from the VOCs emitted to the atmosphere from these products, while providing manufacturers with the flexibility to select VOC ingredients for their products. This approach provides incentives to manufacturers to reformulate their products using VOC ingredients that will likely result in less ozone production.

C. Regulatory Limits

The proposed regulatory limits for the ACRR are a series of reactivity limits for six general coating categories and 30 subcategories of specialty coatings. These reactivity limits are expressed in terms of mass of ozone generation per gram of product. In addition to compliance with the reactivity limits, a regulated entity is also required to comply with labeling, recordkeeping, and reporting requirements.

D. Compliance Requirements

The proposed rule requires all regulated entities to comply by January 1, 2009. The proposed rule includes a provision that allows regulated entities that have not previously manufactured, imported, or distributed for sale or distribution in California any product that complies with applicable California regulations for aerosol coatings to seek an extension of the compliance date until January 1, 2011.

After the compliance date, the regulated entity under this proposed rule will be required to conduct initial compliance demonstration calculations for all coating formulations manufactured or filled at each of their facilities. These calculations must be maintained on-site for 5 years after the product is manufactured, processed, distributed, or imported, and must be submitted to the Agency upon request. The regulated entity may use formulation data to make the compliance calculations; however, EPA is proposing to adopt California's Method 310 as the underlying test method (i.e., formulation data should be verifiable with CARB 310, if requested). Facilities will also be allowed to use EPA's Test Method 311.

E. Labeling Requirements

The proposed rule also includes labeling requirements to facilitate implementation and enforcement of the limits. Labels must clearly identify the product category or the category code provided in Table 1 of the regulation,

the limit for that category, and the product date code. If the date code is not easily discernable, an explanation of the code would need to be included in the initial notification discussed below.

F. Recordkeeping and Reporting

The proposed rule includes a requirement for an initial notification report from all regulated entities to EPA 90 days before the compliance date. This report will provide basic information about the regulated entity and will identify all manufacturers, processors, wholesale distributors, or importers of aerosol coatings. In addition, this report will need to explain the date code system used to label products and it must include a statement certifying that all of the company's products will be in compliance with the limits by the compliance date.

The regulated entity is required to maintain compliance calculations for each of its aerosol coatings formulations. For each batch of a particular formulation, the regulated entity must maintain records of the date(s) the batch was manufactured, the volume of the batch, and the VOC formula for the formulation. Records of these calculations must be maintained 5 years after the product is manufactured, processed, distributed for wholesale, or imported for sale or distribution in interstate commerce in the United States.

The proposed rule does not include any regular, ongoing reporting requirements for most regulated entities. Reporting after the initial compliance report is only required when a manufacturer adds a new coating category. When this happens, a new notification is required. However, the EPA also invites public comment on the feasibility and need for additional reporting requirements.

The proposed rule requires those small manufacturers that qualify for exemption from the limits of Table 1 of subpart E of the rule to make an annual report to EPA providing necessary information and documentation to establish that the products made by the entity should be exempt.

G. Variance

The proposed rule allows regulated entities to submit a written application to the Agency requesting a temporary variance if, for reasons beyond their reasonable control, they cannot comply with the requirements of the rule. An approved variance order would specify a final compliance date and a condition that imposes increments of progress necessary to assure timely compliance.

A variance would end immediately if the regulated entity failed to comply with any term or condition of the variance. The Administrator will provide special consideration to variance requests from regulated entities, particularly small businesses that have not marketed their products in areas subject to State regulations for these products prior to this rulemaking. EPA notes that a variance under EPA's national rule for aerosol coatings under section 183(e) does not alter any requirements under any applicable state or local regulations.

H. Test Methods

Although regulated entities may use formulation data to demonstrate compliance with the reactivity limits, EPA believes it is also necessary to have test methods in place that can be used to verify the accuracy of the formulation data. Therefore, we have included two test methods that can be used by regulated entities or the Administrator to determine compliance with the reactivity limits. In those cases where the formulation data and test data are not in agreement, data collected using the approved test methods will prevail. Regulated entities or regulatory agencies may use either CARB Method 310—Determination of Volatile Organic Compounds in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products or EPA Method 311—Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings to determine the reactive organic compound content of an aerosol coating. CARB Method 310 includes some test procedures that are not required to determine the VOC content of aerosol coatings; for example, Method 310 incorporates EPA Method 24 for determining the VOC content of a coating. We have identified those sections of Method 310 that are not required for compliance demonstration purposes in the regulation. EPA Method 311 was originally developed for liquid coatings; so, it does not include provisions for the collection of the propellant portion of an aerosol coating. Therefore, those choosing to use Method 311 must separate the aerosol propellant from the coating using either ASTM D3063–94 or ASTM D 3074–94.

III. Summary of Impacts

This section presents a summary of the impacts expected as a result of this proposed rule. To ensure that the impacts are not minimized, we followed an approach that would provide conservative estimates for each impact. For environmental impacts, we ensured that our estimated positive impact (i.e.,

emission reduction) was not overstated (i.e., conservatively low). For cost and economic impacts, we ensured that our estimated impacts were not understated (i.e., conservatively high). This approach ensures that conclusions drawn on the overall impact on facilities, including small businesses, are based on conservative assumptions.

A. Environmental Impacts

In accordance with section 183(e), EPA has evaluated what regulatory approach would constitute “best available controls” for this product category, taking into account the considerations noted in the statute. EPA has evaluated the incremental increase or decrease in air pollution, water pollution, and solid waste reduction that would result from implementing the proposed standards.

1. Air Pollution Impacts

The proposed rule will reduce both VOC emissions and the amount of ozone generated from the use of aerosol coatings. Because most States will use the VOC emission reductions resulting from this rule in their ozone SIP planning, we have calculated the reductions associated with the rule in terms of mass VOC emissions and we will refer to a reduction in mass VOC emissions when discussing the impacts of the proposed regulation. EPA believes this is appropriate because the reactivity limits were designed to ensure that the ozone reductions that would be achieved by the limits were equivalent to the mass VOC reductions that would have been achieved by the CARB 2002 mass-based VOC limits. However, because the limits actually reduce the amount of ozone generated from the VOC used in aerosol coatings rather than VOC content by mass, the VOC reductions that we refer to are more accurately described as an “equivalent reduction in VOC emissions.” We will use the term “reduction” in subsequent discussions. Additional information on the method used to calculate the air impacts of the proposed rule are included in the impacts calculation memo contained in the docket to this rulemaking.

As proposed, EPA believes that this rule would reduce nationwide emissions of VOC from the use of aerosol coatings by an estimated 15,570 Mg (17,130 tons) from the 1990 baseline. This represents a 19.4 percent reduction from the 1990 baseline of 80,270 Mg (88,300 tons) of VOC emissions from the product category. While we believe that the above numbers accurately assess the impacts of the proposed rule for SIP credit purposes, we recognize that

significant reductions have already occurred as the result of the implementation of the CARB aerosol coatings regulations. Because many manufacturers sell “CARB compliant” coatings across the country, some of these VOC emission reductions have already been achieved outside of California. We estimate that approximately 18 percent of the total products sold are not compliant with EPA’s proposed limits. Therefore, we estimate that this rule will result in additional VOC reductions equivalent to 3,100 tons per year (i.e., 18 percent of 17,130). We request comment on our estimate of the products that are not compliant with these limits specifically, and on our evaluation of the potential VOC emission reductions generally.

The 18 percent reduction in VOC emissions represents new reductions. However, for ozone SIP purposes, we plan to give States that do not currently have aerosol coating regulations in place full credit for the 19.4 percent reduction from the 1990 baseline. This 19.4 percent reduction is equivalent to a 0.114 pound of VOC reduction per capita.

Although we have not quantified the anticipated impacts of this rule on HAP emissions, EPA expects that the proposed rule would reduce emissions of toluene and xylene, two highly reactive toxic compounds. Toluene and xylene are hazardous air pollutants that manufacturers have historically used extensively in some aerosol coating formulations. However, both of these compounds are also highly reactive VOCs. Therefore, it will be difficult for regulated entities to continue to use these compounds in significant concentrations and still meet the reactivity limits in the proposed rule. EPA believes that the proposed rule based upon VOC reactivity, rather than VOC mass, will provide a significant incentive for manufacturers to cease or reduce use of toluene and xylene in their products.

Due to the reduction in equivalent VOC emissions and ozone formation and the anticipated reduction in hazardous air pollutant emissions, we believe the rule will improve human health and the environment.

2. Water and Solid Waste Impacts

There are no adverse solid waste impacts anticipated from the compliance with this rule. Because companies can continue to sell and distribute coatings that do not meet the reactivity limits after the compliance date as long as those coatings were manufactured before the compliance date the industry does not have to

dispose of aerosol cans containing noncompliant product, which would result in an increase in solid waste. It is possible that the proposed rule will actually result in a reduction in solid waste as more concentrated higher solids coatings may be used as an option for meeting the proposed limits. This will result in fewer containers requiring disposal when the same volume of solids is applied by product users.

There are no anticipated adverse water impacts from this rulemaking.

B. Energy Impacts

There are no adverse energy impacts anticipated from compliance with this proposed rule. EPA believes that regulated entities will comply through product reformulation which will not significantly alter energy impacts. The proposed rule does not include add-on controls or other measures that would add to energy usage or other impacts.

C. Cost and Economic Impacts

There are four types of facilities that will be impacted by the proposed rule. These include the aerosol coating manufacturers, aerosol coating processors, and aerosol coating wholesale distributors, and importers of aerosol coatings. For some products, the manufacturer is also the filler and distributor, while for other products the manufacturing process, the filling process, and the distribution may be done by three separate companies. The primary focus of our cost and economic analysis is the aerosol coating manufacturers as we anticipate that the costs to the fillers, distributors, or importers will be minimal.

For the aerosol coating manufacturer, we evaluated three components in determining the total cost of the proposed rule. These three components include the cost of the raw materials that the manufacturer will use to formulate coatings that comply with the proposed rule, the cost of research and development efforts that will be necessary to develop compliant formulations, and the cost of the recordkeeping and reporting requirements associated with the proposed rule. Because we have limited information on aerosol coating sales for the aerosol coating manufacturers that we have identified, we evaluated each of these costs on a per can basis for each of the 36 coating categories. A brief discussion of each of these cost components is presented below. A more detailed discussion of the cost analysis is presented in the cost analysis memorandum that is included in the docket.

The proposed rule is based on reactivity limits established for six general coating categories and 30 specialty coating categories. To meet the limits, aerosol coating manufacturers may have to reformulate their existing coatings with different solvents and propellants, or at least different combinations of those compounds. The difference in the cost of the solvents and propellants used for formulating the complying coatings and those used for formulating the noncomplying coatings is the basis for the raw material costs.

To determine the raw material costs, we used data compiled by CARB from its 1997 survey of the aerosol coatings industry. Using the data from the survey, CARB developed a typical formulation for a complying coating for each category and a typical formulation for a noncomplying coating for each category. We then compared the cost of the materials used in each formulation to determine the raw material costs per can for each category. The raw material costs per can ranged from a cost savings of \$0.04/can, that is, the cost of the raw materials used in the complying coating was less than the cost of the raw materials used in the noncomplying coating, to a cost increase of \$0.12/can.

Aerosol coating manufacturers not only have to develop formulations that meet the reactivity limits in the proposed rule, but they also must ensure that the reformulated coatings have the same performance characteristics and the coatings that they will replace. We anticipate that this may require manufacturers to invest resources in research and development efforts. For the purposes of this analysis, we assumed that each aerosol coating manufacturer would have to hire one additional chemist to assist in reformulation efforts.

Using a list of aerosol coating manufacturers and the categories of coatings they manufactured that was developed by CARB using its 1997 survey data, we assigned chemists to each coating category based on the number of companies manufacturing coatings in that category. Because most companies manufacture coatings in more than one category, we assigned the chemists for each company based on the number of categories they manufactured. For example, if a company manufactured products in two categories, we assigned 0.5 chemists to that category. We then totaled the number of chemists required for each category.

Using data from the American Chemical Society on chemist salaries and the number of chemists for each category, we then developed annualized

research and development costs for each category. The annualized costs were based on a period of 10 years and an interest rate of 7 percent. These annualized research and development costs for each category were then divided by the number of aerosol cans manufactured in each category to determine the total research and development costs per can for each coating category. Research and development costs ranged from \$0.00/can to \$0.109/can.

Aerosol coating manufacturers will also have costs associated with the recordkeeping and reporting requirements in the proposed rule. These costs include the time required for such activities as reading and understanding the reporting requirements of the rule, reviewing the compliance calculations required under the rule and implementing an approach for performing those calculations, and preparing the initial compliance report. Because the reactivity approach is new to coating manufacturers, we assumed that a supervisor would be performing each of these tasks. We estimated the total cost for recordkeeping and reporting for the industry at \$670,140 per year which equates to \$0.002/can.

The total cost per can for raw materials, research and development, and recordkeeping and reporting requirements ranges from \$0.002 to \$0.141. Based on data from the U.S. Census Bureau on the volume of aerosol paint concentrates produced for packaging in aerosol coatings and information provided by the National Paint and Coatings Association (NPCA) on the amount of concentrate in a can, we estimated that 329,536,000 10.5 ounce cans were produced in 2005. If all of these cans required reformulation, the total nationwide cost of the proposed rule would be \$20,360,521. However, we know that significant progress has already been made in reformulating aerosol coatings to meet the proposed limits. Even before CARB's regulation became effective, its survey data showed that for 10 coating categories, 100 percent of the coatings were complying with the proposed limits in 1997. For the remaining categories, all but two had complying market shares greater than 20 percent in 1997. With CARB's regulation in place, we anticipate that the number of coatings already meeting the proposed limits has increased significantly.

As discussed earlier, we do not think that fillers and distributors will incur additional costs from the proposed rule. The filler would incur additional costs only if the proposed rule would require them to invest in new equipment and

we do not anticipate that this will be the case. The mix of propellants and solvents used by the manufacturer is expected to change, but the changes will not be so significant that the fillers will be unable to continue to use their existing equipment. The only potential costs to the distributor are the labeling requirements and any costs associated with not being able to sell noncompliant coatings. However, the proposed rule does not require the information to be included on the paper label and most manufacturers are meeting the labeling requirements associated with CARB's regulation by using an ink stamp on the bottom of the can. Therefore, the labeling requirements are not expected to have a cost impact on the distributor. The proposed rule also allows distributors to continue to sell products that were manufactured before the compliance date as long as necessary so they will have no lost revenue from the noncompliant coatings.

IV. Rationale

A. Applicability

CAA section 183(e)(1)(C) of the CAA defines "regulated entities" as:

(i) Manufacturers, processors, wholesale distributors, or importers of consumer or commercial products for sale or distribution in interstate commerce in the United States; or

(ii) manufacturers, processors, wholesale distributors, or importers that supply the entities listed under clause(i) with such products for sale or distribution in interstate commerce in the United States.

The proposed ACRR will regulate manufacturers, processors, wholesale distributors, or importers of aerosol coatings. This includes those regulated entities that make aerosol coatings for the DIY market and for the industrial markets. Regulated entities include processors commonly referred to as "fillers" that obtain the liquid and propellant portions of the coating separately and fill the aerosol can. In addition, the rule will regulate distributors of aerosol coatings if those facilities have any responsibility for the labeling of the coatings.

We are proposing an exemption from the limits of the rule for those entities that manufacture only a small amount of aerosol coatings. We believe that this exemption will serve to mitigate the impacts of the rule upon small manufacturers for whom compliance with the rule could impose disproportionately high costs through reformulation of products produced only in small volumes. Given this objective, and in order to avoid unnecessary excess VOC emissions that

could be significant in the aggregate, we are proposing that this exemption from the limits would be available only for those manufacturers that have annual production of aerosol coatings products with total VOC content not in excess of 7,500 kg of VOC in all aerosol coating product categories. We emphasize that this to be determined by total VOC content by mass, in all product categories manufactured by the entity. We consider making this distinction based upon total VOC mass, rather than some reactivity-adjusted calculation, necessary both to minimize the analytical impacts upon the entity seeking the exemption from the rule, and to provide for more effective implementation and enforcement of this aspect of the rule.

A manufacturer that qualifies for the exemption must notify EPA of this in the initial notification report required in proposed section 59.511. As a condition for the exemption from the limits, the proposed rule also requires the entity to file an annual report with EPA providing the information necessary to evaluate and to establish that the products manufactured by the entity are properly exempt from the limits of rule. This information is necessary to assure that the entity is in compliance, even if its products do not meet the limits of the rule. EPA notes that an exemption under EPA's national rule for aerosol coatings under section 183(e) does not alter any requirements under any applicable state or local regulations.

We specifically request comment on whether there is a need for an exemption of this type for very small manufacturers. In addition, we request comment on the features of the exemption as we have proposed it. Finally, in order to get better information about the number of manufacturers that would potentially use such an exemption, we specifically request that interested commenters indicate whether they would elect to use the exemption from the limits.

The proposed rule requires all regulated entities to comply by January 1, 2009. EPA believes that compliance by this date is readily achievable by most, if not all, regulated entities subject to this rule. However, in the case of regulated entities that have not previously met the limits already imposed by regulation in the State of California, EPA believes that it may be appropriate to provide an extension of the compliance date on a case by case basis. Therefore, the proposed rule includes a provision that will allow regulated entities that have not previously manufactured, imported, or distributed for sale or distribution in

California any product in any category listed in Table 1 of this subpart that complies with applicable California regulations for aerosol coatings to seek an extension of the compliance date. Such extensions will be granted at the discretion of the Administrator. The grant or denial of a compliance date extension does not affect the right of the regulated entity to seek a variance under this rule.

B. Regulated Pollutant

Under CAA section 183(e), Congress has directed EPA to issue regulations to reduce VOC emissions from consumer and commercial products. Traditionally, we have regulated the mass of VOC ingredients of the products to attain this end. This regulation will regulate VOC, but will take a different approach. With this regulation, EPA is proposing a rule intended to limit the amount of ozone that is generated by the specific VOC ingredients of the aerosol coating products rather than limit the VOC mass content of the product. This approach will allow EPA to regulate different species of VOC differently, depending on their relative contribution to ozone formation once emitted into the atmosphere. We believe that this approach will achieve reductions in the overall amount of ozone formed by the VOC emitted to the atmosphere from these products, and provide manufacturers with flexibility to formulate products using VOC ingredients. We believe that this approach provides incentives to manufacturers to use VOC ingredients with less reactivity and therefore contribute to less ozone formation.

Under 40 CFR 51.100(s), we have previously excluded compounds from the definition of VOC in recognition of the fact that individual organic compounds differ with respect to their incremental contribution to ozone formation. EPA's approach to VOC exemptions separates organic compounds into reactive and negligibly reactive compounds. The reactivity based approach that EPA uses in the proposed rule, however, recognizes that all such compounds contribute to the formation of ozone. The differences in the amount of ozone that may be formed from a particular VOC are reflected in the reactivity factors assigned to each VOC in Table 2 of the rule. Compounds that EPA previously identified as negligibly reactive have low reactivity factors, while those that are more reactive have higher reactivity factors. The use of reactivity factors makes the distinction between negligibly reactive and reactive compounds unnecessary for the proposed aerosol coatings rule.

These previously exempted compounds will continue to be excluded from the Federal definition of VOC for other purposes.

C. Regulatory Approach

Section 183(e) of the CAA directs EPA to issue national regulations to achieve VOC emission reductions from those categories of consumer products that EPA has identified on the list of product categories. As an alternative, EPA is also authorized to issue a CTG in lieu of such a national regulation if the CTG would be substantially as effective as the rule in achieving the necessary VOC emission reductions. We have determined that a national rule is the best approach for this category.

When developing a regulation under CAA section 183(e), EPA has broad discretion to develop the most effective approach to achieve the intended VOC emission reductions from a category of consumer products. Specifically, CAA section 183(e)(4) states:

(4) Systems of regulation.—The regulations under this subsection may include any system or systems of regulation as the Administrator may deem appropriate, including requirements for registration and labeling, self-monitoring and reporting, prohibitions, limitations, or economic incentives (including marketable permits and auctions of emissions rights) concerning the manufacture, processing, distribution, use, consumption, or disposal of the product.

This proposed regulation includes a combination of reactivity limits, labeling requirements, recordkeeping requirements, and reporting requirements. We have concluded that the only technologically and economically feasible option for reducing the VOC emissions from aerosol coatings and the ozone that is formed as a result of these emissions is to set VOC content limits that will result in reformulation. This conclusion is based on the fact that once a manufacturer uses a VOC as an ingredient in an aerosol coating, it will ultimately be emitted to the atmosphere (i.e., when the product is used). For stationary industrial sources of VOC emissions, EPA has evaluated add-on control devices as a potential option for reducing emissions. Installing such devices to reduce the emissions from an aerosol coating can be neither technologically nor economically feasible. Although EPA could theoretically achieve VOC emission reductions through requirements imposed on product users, CAA section 183(e) only allows the regulation of users through the mechanism of a CTG. EPA has determined that a CTG is not the appropriate mechanism for aerosol

coatings because of the nature of the product category and its users. In developing this regulation, we have, therefore, focused on reformulation options for reducing the amount of ozone formed from VOC emissions from aerosol coating products.

Most EPA and State coating standards include limits in terms of weight of VOC per weight (or volume) of product. However, for reasons discussed below in D.1, we are proposing to regulate this product category based upon the relative reactivity of the VOC ingredients. In addition to these coating limits, the standard includes other regulatory requirements necessary to facilitate effective implementation and enforcement of the coating limits.

D. VOC Regulatory Limits

1. Evolution of Reactivity-Based Requirements

CAA section 183(e) requires EPA to regulate VOC emissions from consumer products for the purpose of reducing ozone. Although EPA has traditionally focused on reducing VOC ingredients by mass in developing regulations under CAA section 183(e), EPA believes that it has authority under that section to devise alternative approaches to reduce VOC emissions from consumer products where appropriate. The statute directs EPA to evaluate what would constitute "best available controls" (BAC) for a product category, and we believe that provision authorizes EPA to consider different approaches for different products.

In determining what would be BAC for aerosol coatings, we are proposing a new approach to achieve the goal of the CAA 183(e) program: A reduction in the formation of ozone. As discussed in section I.C. of this preamble, we believe that the scientific understanding of VOC reactivity has progressed sufficiently to support a reactivity-based regulation for the purposes of this product category. As discussed previously, EPA has concluded that the only reasonable approach for limiting ozone formation from aerosol coatings is to impose limits that encourage reformulation to reduce ozone formation. A brief overview of the various types of rulemakings available to use, and the selection of reformulation levels is presented below. The labeling and other requirements are addressed in future sections.

i. Traditional VOC Mass-Based Limits.

In previous national rules developed under section 183(e), EPA has established limits on the VOC content of coatings by mass. For the consumer products rule and the automotive

refinishing rule, these limits were based on the weight percent of VOC in the coating. For the architectural and industrial maintenance (AIM) coatings rule, the limits were based on the weight of VOC per volume of coating. To meet traditional VOC content limits, coating manufacturers have several options. For example, increasing the solids content of the coating will result in a lower VOC content per unit of volume or weight. Replacing some of the organic solvent in a coating with water can also decrease the VOC content of the coating. Over the years, EPA has also determined that some compounds are negligibly reactive compared to other VOC; that is, they produce less ozone or produce ozone less quickly than other VOC. We have exempted these compounds from the generally applicable regulatory definition of VOC. To achieve compliance with other CAA section 183(e) regulations, manufacturers can use these exempt compounds in place of other VOCs and thereby reduce the VOC content of their coatings for regulatory purposes.

The approach a manufacturer chooses to use to reduce the VOC content of its coatings varies depending upon many factors including the intended use of the product, the cost of the reformulated product, the performance of the reformulated product, and other environmental impacts of the reformulated product. For each coating in the aerosol coating category, the approach for reducing the VOC content may be different because each category, and even each product within the category, has different performance requirements.

Even though reducing the VOC content of aerosol coatings could have a significant impact on the ozone resulting from emissions of VOC from aerosol coatings, this approach does have limitations. With an aerosol coating, manufacturers are more limited on how high the solids content of the coating compared to coatings applied using spray techniques or brushing. In addition, as the solids content increases, manufacturers are often forced to use more of VOC such as toluene and xylene that are more effective solvents but are also more reactive and hazardous air pollutants. Increasing water content in aerosol coatings can be a problem because water-based coatings take longer to dry, which is a particular concern in humid environments. A coating that takes longer to dry may impact production at an industrial facility where many specialty aerosol coatings are used. Replacing some VOC ingredients with others that are exempt from the regulatory definition of VOC

can also have some negative implications. For example, acetone is extremely volatile and may dry too fast for some applications. We are also concerned about the environmental impacts of increasing the use of such solvents as methylene chloride, which although exempt from the definition of VOC is listed as a hazardous air pollutant.

Although potential limitations exist for establishing limits on the VOC content of aerosol coatings, we believe that it is a technologically feasible alternative for reducing the formation of ozone from the use of aerosol coatings. It is an approach we have used in many regulatory programs, including 183(e). Our evaluation of BAC options for aerosol coatings includes two options for limiting the VOC content of coatings.

ii. Reactivity-Based Limits.

EPA recognizes that individual VOC can react differently in the atmosphere and can vary in the amount of ozone generated. Organic compounds can produce varying amounts of ozone because they react at different rates and via different reaction mechanisms. One concern expressed by industry is that if the VOC content limits are too low manufacturers may be forced to use more reactive solvents to achieve comparable product performance. For example, as discussed earlier, manufacturers may have to increase the usage of toluene and xylene in order to reformulate to a higher solids coating. Both toluene and xylene are very reactive compounds and have the potential to form significantly larger quantities of ozone than many other solvents. If manufacturers use VOC with higher reactivities, it is possible that decreasing the VOC content of the coating potentially increases the actual ozone formation.

This situation of a decrease in VOC emissions by mass but a potential increase in ozone formation has already been seen to occur in California. For example, Table 11-2 of California's 2005 Architectural Coatings Survey, (draft report), indicates that between 2001 and 2005, the sales volume for flat coatings increased by 7 percent (to 37.3 million gallons) while the total mass of VOC for this category for the same period decreased by 11 percent. However, even though the total emissions of VOC by mass decreased, the total ozone formed as a result of those VOC is estimated to have increased 5.4 percent (1.88 tpd) during the same period. This potential increase in ozone formation, notwithstanding decreased VOC emissions by mass, is a result of manufacturers using smaller

amounts total VOC, but an increased amount of more reactive VOC in order to meet tighter VOC limits (See California's 2001 Architectural Coatings Survey Final Reactivity Analysis—Table 2–6 (March 2005) and 2005 Architectural Coatings Survey DRAFT Reactivity Analysis—Table 2–2 (January 2007)). [For a complete copy of this report, please see http://www.arb.ca.gov/coatings/arch/survey/2005/Draft_2005_Survey_Rpt.pdf. http://www.arb.ca.gov/coatings/arch/reactivity/Draft_Reactivity_Rpt.pdf. http://www.arb.ca.gov/coatings/arch/reactivity/final_reactivity_analysis_rpt.pdf.

EPA believes that the use of relative reactivity is appropriate for aerosol coatings in particular, because there is a limit to the extent that solids contents can be increased and still have a coating that can be dispensed through an aerosol canister. This limitation precludes the range of reformulation with higher solids content that can be achieved for other types of coatings.

In the past, EPA has expressed reservations about using the concept of VOC relative reactivity in regulations for consumer products due to limitations in scientific studies and practical concerns about developing an effective regulation based on this concept. More recently, the California Air Resources Board (CARB) has worked to develop an effective way to regulate based upon this concept. In developing its own standards for aerosol coatings, CARB established limits are intended to limit the amount of ozone that is formed by a particular coating, rather than limit the VOC content of the coatings by mass. To develop a reactivity-based rule, CARB first identified the relative reactivity of each VOC ingredient used in aerosol coatings. CARB evaluated this using the Maximum Incremental Reactivity scale developed by Dr. William Carter.²⁷ In developing this scale, Dr. Carter identified and quantified each mechanism for ozone production that would exist for specific VOC, including those used in aerosol coatings. The final MIR value for each VOC is expressed in units of weight of ozone production per weight of VOC.²⁸ CARB used MIR values and the uncertainty values assigned particular bins of chemicals with product formulation data to derive, through an iterative process, a limit for the overall

mass of ozone production allowed per mass of product. Because all organic compounds can contribute to the formation of ozone, CARB's reactivity limits include ozone formed by all VOC ingredients included in the coating, including compounds that EPA had previously exempted from the regulatory definition of VOC.

After review of Dr. Carter's work, the CARB rule, and recent studies organized under the RSWG (described earlier in the background section), we believe that the reactivity approach is a viable option for reducing the ozone that results from VOC emissions from the aerosol coatings category. These previous studies have indicated that the use of VOC reactivity can be effective for controlling ozone in episodes where NO_x is at its highest levels, such as in urban areas. For these types of VOC-limited conditions, ozone formation is more sensitive to VOC emissions. In such situations, limiting the reactivity of the VOC emissions can be more effective than merely limiting the overall mass of the VOC emissions.

EPA notes that metrics other than the MIR scale for characterizing reactivity have been studied, for example, the Maximum Ozone Incremental Reactivity (MOIR) or the Regional Average Ozone metric, but the box model MIR is the scale that has been most widely used and analyzed. Recent studies of 9 different ways of defining VOC reactivity have shown that all major methods are directionally consistent and highly correlated.²⁹ Derwent (2004) further concluded that "the most promising reactivity metrics are EKMA-MIR and Regional MIR or MIR-3D." Because the only metrics with detailed values available for all chemical species of interest are the box model (EKMA) metrics, and the box model MIR has been used extensively in formulations under the California rule, we believe that the box model MIR is the most feasible metric for VOC relative reactivity to use at the current time. One important characteristic of the box model MIR is that it has the widest range of all metrics, which provides the best incentive for the substitution of higher reactive VOC with lower-reactive VOC. While this might allow a larger mass of VOC to be emitted than other metrics, tight limits will ensure that the increased mass will be restricted to the least reactive VOC.

Previous studies of large-scale, equal-ozone substitutions of VOC species have

shown that downwind ozone could increase due to upwind substitutions of larger amounts of lesser reactive VOCs, but any increases tended to be much smaller than the magnitude of concurrent ozone decreases. The substitutions had a larger effect on reducing the higher ozone concentrations in the area upwind than they did on increasing downwind concentrations. Even in the extreme substitution scenarios that have been studied, the benefits for ozone (reduction in ozone peak) were significant. We believe that realistic changes in formulation using the MIR, especially if limited to aerosol coatings, are unlikely to result in a noticeable increase in ozone downwind. First, downwind areas are usually NO_x-limited, so small amounts of additional VOC will not influence ozone formation significantly. Furthermore, in cases where downwind areas are VOC-limited, potential downwind ozone increases will be counteracted to some extent by ozone decreases resulting from VOC substitution occurring simultaneously in the downwind area. Thus, we expect VOC reformulations based on the MIR scale to lead to an overall net decrease in ozone formation and exposure.

In the past, there has been some concern over the applicability of MIR values across the entire country, however studies³⁰ now demonstrate that the calculated MIR scales do not have significant geographical or temporal variation. Based on this information, we believe that using the MIR values to establish the relative reactivity of VOC ingredients in a reactivity-based approach is a viable option for consideration in a national rule.

While the chemical mechanisms for ozone production for many individual chemicals are somewhat to highly uncertain, this uncertainty is smaller for the majority of the organic compounds used as ingredients in aerosol coatings. Most of the VOC used in the products covered by this rule have been characterized as category 1 or 2 uncertainty, which Carter classifies as relatively certain (category 1) or uncertainty less than a factor of 2 (category 2).³¹

³⁰ Hakami, A., M.S. Bergin, and A.G. Russell (2004a) "Ozone Formation Potential of Organic Compounds in the Eastern United States: A Comparison of Episodes, Inventories, and Domains," *Environ. Sci. Technol.* 2004, 38, 6748–6759.

³¹ Carter, W.P.L. (2003) "The SAPRC-99 Chemical Mechanism and Updated VOC Reactivity Scales," Report to the *California Air Resources*

²⁷ Carter, W. P. L. (1994) "Development of ozone reactivity scales for organic gases," *J. Air Waste Manage. Assoc.*, 44: 881–899.

²⁸ "Initial Statement of Reasons for the California Aerosol Coatings Regulation, California Air Resources Board," May 5, 2005.

²⁹ Carter, et al., 2003, Derwent, R.G. (2004) "Evaluation and Characterization of Reactivity Metrics," Final Draft, Report to the U.S. EPA, Order No. 4D-5844-NATX, November 2004.

Furthermore, uncertainty in the reactivity scales can be taken into account in the selection of reactivity limits as CARB did in defining the limits in its aerosol coatings regulation. CARB assigned each compound in its table of MIR values to one of six bins based on expert judgment about the level of uncertainty in the chemical mechanisms used to calculate the MIR value. CARB assigned an uncertainty factor to each of the six bins. CARB then adjusted the MIR values used in the calculation of the reactivity limits by multiplying each MIR by its assigned uncertainty factor. By applying this uncertainty factor, the resulting reactivity limits are more stringent than they would be calculated based on the MIR values alone, and provide some protection against setting values too low based on incomplete understanding of the chemistry of specific compounds.

For some compounds used in aerosol coatings for which no MIR value has been calculated, CARB assigned an upper limit MIR value based on theoretical limits of the ozone that could be formed by the compound. This approach is also conservative, providing some protection against setting reactivity limits too low or allowing reformulations that would increase ozone formation. We have set the reactivity factors in the proposed rule equal to the MIR or upper limit MIR used by CARB. This ensures that the limits in our proposed rule are equivalent to CARB's current rule, but allows EPA flexibility in the future to change this approach, if warranted.

All of the VOC that we have identified as common VOC components of aerosol coatings have been assigned reactivity factors. However, it is possible that a novel compound could be used in a product affected by this rule. In CARB's rule, if a VOC has not been assigned a MIR or upper limit MIR value, it cannot be used in a product to comply with that rule. In EPA's proposed rule, if a VOC is not assigned a reactivity factor, then the compound is assigned the maximum reactivity factor for any compound listed in the rule. Manufacturers and other interested parties can petition the Administrator to add a reactivity factor to the table in the rule for such a compound and are encouraged to provide sufficient evidence to allow the Administrator to assign a reactivity factor that is consistent with values assigned to the other listed compounds. This approach ensures that the reformulations allowed

by the rule will not increase ozone formation.

Based on the information that we have about VOC used in aerosol coatings, we believe that the relative reactivity approach for this particular consumer product category is appropriate. However, there may be other source categories EPA considers for regulation where the organic compounds and their relative reactivity have not been as well-characterized. EPA has determined that it is appropriate to use the MIR values as the reactivity factors for this particular regulation. If a more suitable reactivity scale is developed in the future, EPA will evaluate that scale for possible regulatory use.

Therefore, our determination that the reactivity approach using the MIR values as the reactivity factors is currently only applicable to the aerosol coatings category. EPA has not concluded that it is appropriate to use the MIR scale for all applications. In developing future regulations, EPA may determine that a reactivity approach is not appropriate for a particular context or that a reactivity approach should be based upon reactivity factors other than the MIR values. EPA will make such future determinations on a case-by-case basis.

Based on EPA's determination that the reactivity approach can be effective in reducing the amount of ozone formed from the use of aerosol coatings, EPA has included the evaluation of limits based on reactivity in selecting BAC for the aerosol coatings category. The options EPA considered in developing BAC are presented in the following section.

2. Assessment of Best Available Controls.

CAA section 183(e) directs EPA to regulate Consumer and Commercial Products using "best available controls." The term "best available controls" is defined in CAA section 183(e)(1)(A) as:

The degree of emissions reduction that the Administrator determines, on the basis of technological and economic feasibility, health, environmental, and energy impacts, is achievable through the application of the most effective equipment, measures, processes, methods, systems or techniques, including chemical reformulation, product or feedstock substitution, repackaging, and directions for use, consumption, storage, or disposal.

EPA believes that CAA section 183(e) thus authorizes EPA to evaluate what approach would be "best" for this product category in light of various relevant factors.

In order to evaluate what would constitute BAC for this source category, EPA examined the approaches already attempted in other regulations by States. As discussed above, the California Air Resources Board (CARB) has a history of regulating VOC emissions from the aerosol coatings category. While several other States have regulations under consideration, only Oregon and Washington have existing standards and both of those States' regulations are based on CARB's 1996 Tier 1 VOC mass-based limits. Based on the experiences of CARB, EPA has considered both mass-based and reactivity-based limits for this product category. We considered three possible options for BAC for this category based upon past CARB regulations:

- i. CARB 1996 VOC mass-based limits (Tier 1);
- ii. CARB 2002 VOC mass-based limits (Tier 2); and,
- iii. CARB 2002 reactivity-based limits.

In 1996, CARB implemented its first aerosol coatings regulation. The 1996 regulation contained two tiers of mass-based VOC limits. The first tier took effect in 1996 and the second tier, which contained more stringent mass-based VOC limits, was scheduled to take effect in 1999. CARB was required to conduct a public hearing on or before December 31, 1998, on the technological and commercial feasibility of achieving the 1999 limits and could grant an extension of time not to exceed 5 years if their Board determined that the second tier of limits was not technologically or commercially feasible by December 31, 1999.

On November 19, 1998, CARB adopted amendments to its aerosol coatings regulation by modifying the December 31, 1999, mass-based VOC limits and extended the effective date for those limits to 2002. However, CARB's Board recognized that some of the second tier limits would still be technologically challenging and directed CARB staff to develop a compliance option based on VOC reactivity. On June 22, 2000, CARB amended its regulation to replace the 2002 mass-based VOC limits with reactivity-based VOC limits intended to achieve the same degree of ozone reduction.

EPA did not consider the 1999 mass-based limits in our BAC analysis because CARB determined that those limits were not technologically feasible and never implemented the limits. CARB replaced the 1999 mass-based limits with more stringent limits in some categories and less stringent limits in other categories. We did include these 2002 VOC mass-based limits that

replaced the 1999 VOC mass-based limits in our BAC analysis.

Each of the three options EPA considered is discussed below. See the docket to this rulemaking for the tables of limits for each option.

i. CARB 1996 VOC Limits.

In 1995, CARB proposed limits on the VOC content of aerosol coatings. These limits were based on limits established by the Bay Area Air Quality Management District (BAAQMD) in Rule 8-49 in 1990. CARB's regulation included limits on six general categories of aerosol coating products and 29 specialty coating categories. The regulation established limits on the maximum VOC content, based on percent by weight, for each coating category. The standards were effective January 8, 1996; therefore they are referred to throughout this preamble as "CARB 1996 VOC limits."

According to CARB's Initial Statement of Reasons, the support document prepared by CARB for the new regulation, the 1996 limits were expected to reduce VOC emissions from the use of aerosol coatings in California by 12 percent. CARB determined that for most of the aerosol coating product categories covered by the rule, there were already products in the marketplace that met the 1996 limits. Comments made by industry members on the regulation indicated that industry believed the limits were feasible.

We believe that the 1996 VOC mass-based limits established by CARB for aerosol coatings are both technologically and economically feasible. Industry has complied with the 1996 limits in California for many years. CARB estimated that the 1996 limits would achieve a reduction of approximately 12 percent in VOC emissions and we believe that implementing these limits nationwide would result in a similar reduction. In 1997, CARB conducted a survey of aerosol coating manufacturers. For each of the major categories of aerosol coatings, the sales-weighted average VOC content for the category met or was lower than the 1996 limit. We know of no reason why these limits could not be established on a nationwide basis for the aerosol coatings category, providing a similar level of emission reduction.

ii. CARB 2002 VOC Mass-Based Limits.

As discussed earlier, CARB's 1995 regulation established two tiers of mass-based limits that took effect in 1996 and 1999. In 1997, CARB conducted a survey of manufacturers supplying aerosol coatings in California. The survey requested formulation and cost

data for existing products in each category and information on the manufacturer's research and development efforts to reduce the VOC content of coatings.

Using the results from the 1997 survey and input from manufacturers, CARB revised the second tier aerosol coatings limits and extended the compliance date from 1999 to January 1, 2002. These limits are referred to as "CARB 2002 VOC Limits" in this preamble. The new limits were more stringent than the 1996 limits for all of the coating categories. CARB estimated that the 2002 limits would result in a VOC reduction of 3.1 tons VOC/day (or 8.4 percent) from the 1997 emission levels.

Based on CARB's 1997 survey data and CARB's later conclusion that the second tier mass-based VOC limits may not be feasible, EPA is concerned about the technological feasibility and availability of coatings to meet the 2002 VOC limits. Although the limits appear to be both feasible and available for some categories of aerosol coatings, the survey data indicate that this may not be true for all of the categories. For example, for the category of flat coating products, the survey showed that out of a total of 129 products, none met the 2002 VOC limits. For primers, only 5 of 162 products, less than 1 percent of the market, met the 2002 VOC limits. The market share for non-flat coatings meeting the limit was only 5 percent. These three categories, flat coatings, non-flat coatings, and primers, represent three of the four largest categories of aerosol coatings. While not dispositive, we think the absence of products meeting the limits is indicative of technological and feasibility constraints that would make the limits difficult to achieve.

Although the CARB survey was conducted in 1997 and it is possible that the technology has advanced since that time in order to meet such stringent mass based limits, we are concerned that this may not have happened. Although CARB adopted the 2002 VOC limits, these mass-based limits never took effect because CARB replaced the 2002 VOC limits when CARB adopted new reactivity-based limits for aerosol coatings in June 2000. It is likely that coating manufacturers have adjusted their research and development efforts towards reducing the reactivity of the VOC content of their coatings rather than the VOC mass content of their coatings. In some cases, a reduction in the reactivity may coincide with a reduction in VOC content but as discussed earlier, this is not necessarily the case. In fact, it may be possible to

increase the VOC content of a coating while reducing the overall reactivity of the VOC ingredients. Because of this, we presume that industry may be no closer to meeting the 2002 VOC mass limits than they were in 1997.

In the March 2000 edition of the "Issue Backgrounder," NPCA's quarterly newsletter, NPCA states that the 2002 limits "would be technologically impossible for water-based coatings." CARB has also indicated that some of the limits may be difficult to meet with water-based technology. As water-based coatings are among the most environmentally friendly coatings, we are reluctant to base a rule on limits that could preclude the use of this technology.

Although we believe the 2002 VOC limits would have a significant environmental benefit, we have concerns about the technological feasibility and availability of coatings that meet these limits and therefore whether these limits represent BAC for the aerosol coatings industry.

iii. CARB 2002 Reactivity Limits.

As directed by its Board in 1998, CARB worked with industry to evaluate a VOC reactivity-based approach for the aerosol coatings category that would achieve a reduction in the formation of ozone equivalent to the 2002 mass-based VOC limits. Although CARB initially planned the reactivity-based approach as an alternative compliance method to the 2002 VOC mass-based limits, it ultimately concluded that having simultaneous mass-based and reactivity-based limits would cause confusion and decided to have only reactivity-based limits. To ensure the reactivity-based limits would achieve, at a minimum, an equivalent reduction in the formation of ozone to the 2002 VOC mass-based limits, CARB based its 2002 reactivity limits on the 2002 VOC limits. CARB first determined the amount of ozone reduction that it anticipated would be achieved from the implementation of the 2002 mass-based VOC limits. CARB then calculated, through an iterative process, an equivalent reactivity-based limit, so that the reactivity-based limit would result in the same ozone reduction as the mass-based limit. As described earlier, the required amount of ozone reduction was adjusted upwards to account for the possible uncertainty in reactivity values.³²

³² "Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products—California Air Resources Board," Chapter IV, May 5, 2000.

The data from the 1997 survey demonstrated that complying products for the aerosol coatings reactivity limits were available in all but two specialty categories even in 1997. CARB has only received one variance request for the reactivity-based aerosol coating limits (<http://www.arb.ca.gov/consprod/variance/variance.htm>). NPCA has supported both the reactivity approach and the established limits. Based on a review of the limits and the supporting data, we believe that the reactivity limits established by CARB for the aerosol coatings category are technologically feasible and available as contemplated in section 183(e).

3. Determination of Best Available Controls (BAC)

We believe that the 1996 VOC limits developed by CARB are technologically feasible and, based on CARB's cost analysis, are also economically feasible. Therefore, they are certainly "available." However, these limits were based on technology that was available in 1995, when CARB first proposed the limits. During the last 10 years, manufacturers of all types of paints and coatings have made significant technological advances in coating technology in response to the development of various state and national rules limiting both the VOC and HAP content of coatings. The 12 percent reduction in VOC emissions that could be achieved through the implementation of the 1996 limits is significantly less than the estimated 20 percent reduction in VOC emissions achieved by the implementation of the other national rules established under CAA section 183(e). We believe that the CARB 1996 VOC limits do not represent BAC for the aerosol coatings category if more stringent levels are available.

Although we believe the industry is capable of meeting limits more stringent than the 1996 VOC limits, we are concerned about the technological feasibility of the 2002 VOC mass-based limits. The 2002 VOC limits are more stringent than the 1996 limits. CARB's survey data indicated that many manufacturers would have a difficult time achieving the VOC content limits proposed for several of the major categories of aerosol coatings (See <http://www.arb.ca.gov/regact/conspro/aerosol/isor.pdf>). In addition, NPCA's concern that the limits may not be achievable through the use of water-based technology is of particular concern to us. Water-based coatings are an environmentally friendly technology that we do not want to be lost as an option to manufacturers. So long as VOC emission reductions contemplated

by CAA section 183(e) are achieved, we believe that it is important that manufacturers retain as much flexibility as possible in selecting a reformulation technology to ensure they can manufacture coatings that meet the performance specifications required. In addition, we remain concerned that if water-based coatings are not an option to meet the limits, higher-solids coatings will be the primary alternative. Although we support the use of higher-solids coatings as an alternative to high VOC content coatings, we are concerned that if the limits are too stringent industry will be driven to increase its use of toluene, xylene, and other aromatic compounds. These aromatic compounds are all extremely effective solvents for use in higher-solids coatings, but they are also highly reactive compounds that generate more ozone than other solvents commonly used by the aerosols coating category.

As discussed earlier, we believe the reactivity approach is appropriate for the aerosol coatings category because the organic compounds used by the industry are well-characterized. Because the 2002 reactivity limits developed by CARB are based on the VOC reduction associated with the 2002 VOC limits, they ensure that the reactivity limits will achieve an equivalent environmental benefit to the 2002 VOC limits. The reactivity limits also offer industry significantly more flexibility in achieving that environmental benefit. Industry can substitute to lower reactivity solvents, use water-based technology, use higher-solids technology (without the potential drawbacks associated with the use of this technology in a mass-based VOC standard), or any combination of these approaches to meet the limits.

We have concluded that the reactivity limits established by CARB are based on sound scientific principles and represent an equivalent environmental benefit to even the most stringent 2002 VOC limits. It is likely that if EPA were to use a mass-based VOC approach for the aerosol coatings category, we would be required to set less stringent limits, perhaps based on the 1996 limits. Such an approach would achieve less environmental benefit.

EPA then evaluated the cost and economic impacts of the reactivity-based limits. The economic impact assessment focuses on changes in market prices and output levels. A more detailed discussion of the economic impacts is presented in the economic impact analysis memorandum that is included in the docket.

Both the magnitude of control costs needed to comply with the proposed

rule and the distribution of these costs among affected facilities can have a role in determining how the market prices and quantities will change in response to the proposed rule when finalized. In this case, at the facility level, we have some uncertainty concerning both the amount of individual products being produced and whether the products currently comply with the proposed rule, or whether additional costs associated with reformulating the products will be required. Because California has a similar rule and products sold in California have already complied with the California rule, the costs imposed by the proposed EPA rule would entail only minor additional recordkeeping and recording costs. We also know that facilities are involved in production of other products not covered by this rule. We have no quantitative information on the relative contribution to revenue of products not covered by the rule in comparison to products covered by the rule.

Provided with the cost analysis is a cost per can estimate of going from a non-complying formulation to a complying formulation, and a sales price per can for each of the six general coating categories and the thirty specialty coating categories. Also provided is an estimate of the fraction of each coating category that complied before the imposition of the CARB rule. Finally, with the cost analysis is a list of facilities producing products covered by the CARB rule from a 1997 CARB survey and which categories are produced at each facility.

The cost per can, as a percentage of prices per can for going from non-complying to complying on a category basis, ranges from a cost savings to cost of 2.71 percent for the exact match finish industrial category. In order to provide a very rough measure of the impact on a per facility basis, the cost per price measure for each category produced by a particular facility was multiplied by the pre-CARB rule non-complying percentage and averaged across categories using a weighting of industry-wide market share from the pre-CARB rule survey.

The highest cost-to-sales ratio is 1.42 percent. Since this does not include revenues from other products, or the reduction in cost due to the CARB rule, it is very unlikely that the cost-to-sales ratio for any facility would exceed 1 percent. Thus a significant impact is not expected for a substantial number of small entities.

No significant market impact is expected because of the small cost increase compared to the price. Neither full cost absorption nor full cost pass-

through would result in significant impacts.

4. Consideration of Other Factors

In evaluating options for BAC, EPA must evaluate not only the positive environmental benefits of BAC but any potential negative environmental or health benefit. While reducing the population's exposure to ground-level ozone is important, exposing the population to increased levels of potentially toxic VOC is also a concern. This could occur since the use of relative reactivity encourages the use of specific (i.e., low reactivity) compounds to reduce ozone, despite other potential environmental and public health concerns. One compound that we are concerned about is methylene chloride, which has an extremely low MIR value and has also been listed as a HAP under section 112 of the Clean Air Act because of its potential toxic effects on human health and the environment. We remain concerned about the potential impact of an increase in the use of this compound. There are some HAP that would be reduced as a result of a regulation with a reactivity-based approach. For example, HAP such as toluene are highly reactive and accordingly have high MIR values. Therefore, they are unlikely to be used in large quantities in any aerosol coatings subject to a relative reactivity based regulation. In fact, we expect their use to be reduced. Thus, although CAA section 183(e) directs EPA to control VOC emissions from consumer products only for purposes of achieving the ozone NAAQS, we anticipate that choices made to regulate VOC can have collateral benefits or disbenefits in ways not related to the ozone NAAQS.

We are seeking comment on possible approaches to address the HAP emissions from aerosol coatings, including the use of a voluntary program. A voluntary program would seek to provide incentives to industry that voluntarily reduce the use of HAP in their product formulations. We request comment and suggestions on how this program could be identified,

tracked, and recognized, including suggestions on the following:

- Whether the program would recognize only those formulations that reduced HAP content from a baseline before this rule was promulgated or if it should recognize all "low HAP" coatings.
- What should constitute "low HAP." This could potentially be a set amount (percent or absolute) reduction or a maximum overall HAP content.
- What type of documentation should be required to document that the voluntary reduction has occurred. We are concerned that the documentation not be so burdensome as to be prohibitive; however, we want to ensure that facilities claiming "low HAP" coatings are meeting these requirements.
- What type of acknowledgement can be provided. We believe that some type of labeling of the product would be an option, but welcome other suggestions.

E. Compliance Demonstration Requirements

EPA is proposing compliance demonstration requirements necessary to ensure compliance with the rule. Initial compliance demonstration with this rule requires the regulated entity to complete initial compliance calculations for all coatings and develop and submit the initial notification. Ongoing compliance demonstration and reporting is only required when a regulated entity becomes responsible for a coating category that was not included in the original notification.

1. Determination of Coating Content

The ACRR allows a facility to determine compliance using either VOC formulation data or through the use of California's Test Method 310 or EPA's Test Method 311 (see Selection of Test Method). If formulation data are used, the regulated entity would need to identify and maintain records of all VOC present in the coating and propellant portions of the final aerosol product at a level equal to or greater than 0.1 percent. The same levels of recordkeeping would be required if CARB Method 310 or EPA Method 311 were used. In the event of an

inconsistency between the results of Method 310 or 311 test data and a calculation based upon formulation data, the Method 310/311 data will govern the compliance calculation. These formulation data will then be used to calculate the reactivity value for the coatings, which would be compared to the limits presented in Table 1 of the rule.

We are aware that a single regulated entity may have tens, or even hundreds, of different product formulations, especially if different colors of the same basic product have slightly different formulations. It is not our intent to create unnecessary burden and we seek comment on how to limit this burden and still ensure compliance.

2. Calculation of Reactivity of Coating

Once the coating (including coating liquid and propellant) formulation data are known (i.e., either through formulation calculations or use of an approved test method), the calculation of the reactivity value for the product is relatively simple. Tables 2A, 2B, and 2C of the regulation contain reactivity factors that are currently based on the MIR values, and in some cases the upper limit MIR values, used by CARB in its regulation. These reactivity factors are used in conjunction with the formulation data to demonstrate compliance with the reactivity limits. First the compound Weighted Reactivity Factor (WRF) is calculated by multiplying the weight fraction of the individual ingredient (obtained from the formulation data) by the reactivity factor (RF) for that ingredient obtained from Table 2 of the regulation.

$$WRF_i = (WF_i) * (RF_i) \quad \text{Equation 1}$$

Where:

WRF_i = Weighted reactivity factor for component i, g O₃/g product
 WF_i = Weight fraction of component i
 RF_i = reactivity factor for component i, g O₃/compound i

The WRFs for each component in the total coating are then summed to obtain the Product Weighted Reactivity (PWR).

$$PWR_p = WRF_1 + WRF_2 + \dots + WRF_n \quad \text{Equation 2}$$

Where:

PWR_p = Product weighted reactivity for product P, g O₃/g product
 WRF₁ = Weighted reactivity factor for component 1, g O₃/g component
 WRF₂ = Weighted reactivity factor for component 2, g O₃/g component

WRF_n = Weighted reactivity factor for component n, g O₃/g component

Both of these steps are incorporated into a single equation:

$$PWR_p = \sum_{i=1}^n (WF_i) * (RF_i) \quad \text{Equation 3}$$

Where:

PWR_p = Product weighted reactivity for product P, g O₃/g product
 WF_i = Weight fraction of component i

RF_i = Reactivity factor for component i , g
 O_3 /compound i
 n = Number of components in product P

The reactivity factor equals zero for non-solid components without carbon. Solid components, including but not limited to resins, pigments, fillers, plasticizers and extenders do not need to be included in this equation since the reactivity factor for all solids is zero. If a VOC component is not listed in Table 2, it is assigned a RF equal to the maximum value listed in the table.

The PWR for each product must then be compared to the limit for the specific coating category, provided in Table 1 of the regulation, to determine compliance.

F. Labeling Requirements

Section 183(e) of the CAA explicitly authorizes the EPA to require labeling and other requirements as part of a regulation. We are proposing to include labeling requirements that are necessary to implement the regulations effectively and to assure compliance. The requirements we propose pertain to the date the aerosol can is filled, the coating category of the product, and the applicable ACRR limit for the product.

The proposed regulation requires that containers for all subject coatings display the date of manufacture (or a code indicating the date). The date of manufacture on the label or can allows enforcement personnel to determine whether the coating was manufactured prior to or after the compliance date. The coating category and reactivity limit allow enforcement personnel to select a can of aerosol coating, test it using either CARB Method 310 or EPA Method 311, and compare the test results to the reactivity limit on the can.

G. Recordkeeping and Reporting Requirements

CAA section 183(e) also authorizes EPA to impose recordkeeping and reporting requirements. We are proposing recordkeeping and reporting requirements that are necessary to ensure compliance with the regulation. We propose to require an initial notification report for regulated entities. This report will provide basic information on the regulated entity (e.g. name, location) and will identify all coating categories that are manufactured at the facility. This will provide the EPA Regional Offices with a listing of companies in their areas that are manufacturing, processing, distributing, or importing aerosol coatings so that the appropriate Regional Office can follow up with those companies in the event a compliance issue arises. Furthermore, this report will explain the date code system used to label products, if the

date code is not immediately obvious (e.g., month-day-year format). This will assist EPA in identifying products that were manufactured after the compliance date and are therefore subject to this regulation. Finally, the affected entity is required to include an explanation of how the term "batch" will be interpreted for each formulation. This report is due 90 days before the compliance date for the rule.

Under the proposed rule, the regulated entity is required to conduct compliance calculations for each coating formulation. These calculations must be maintained onsite, for 5 years. However, we are proposing that no reporting of these calculations or the results to EPA is required unless a specific request for those results is made by the Administrator (defined in the regulation to include EPA Regional Offices). We are also proposing that the regulated entity must maintain records of the date each batch of a particular formulation was manufactured, the volume of each batch, the number of cans manufactured in each batch and each formulation, and the recipe used for formulating each batch.

After the initial compliance report, we are proposing to require additional reporting if a regulated entity adds a new coating category or changes other information in the initial report (e.g., contact information, file location). Specifically, when this happens, we are proposing to require a new notification containing the updated information.

We are also requesting comment on whether the proposed recordkeeping and reporting requirements included in this proposed rule should be expanded to ensure that the Agency can verify a regulated entity's compliance with the regulation. To verify compliance of an individual product with the applicable limit, it is necessary to analyze its VOC composition and calculate the product-weighted reactivity of the mixture. Without prior information about product composition, identifying the VOC composition of a product is difficult. Therefore, we request comment on the feasibility and need for a requirement for regulated entities to submit to the Agency their VOC formulations for each product or product formulation in the initial report and on a periodic basis thereafter. We anticipate that such a report would consist of a simple listing of the following items: (1) A manufacturer identifier, (2) a product identifier, (3) the applicable product-weighted reactivity-based limit, (4) the Chemical Abstract Service number of each VOC component, (5) the maximum mass fraction of the VOC component in the

product, and (6) the applicable reactivity factor for the VOC component. Because CAA section 183(e) is intended to achieve VOC emission reductions for purposes of reducing ozone, the composition information provided in the report would be limited to the VOC components of the coating and would not include information on the resins or other non-VOC components. Because each unit of product must meet the applicable limits of the rule, the report would only need to address VOC composition and would not include information on the quantity of each product produced or sold.

Given that regulated entities are required to keep such composition information to demonstrate compliance under the proposed rule, a requirement to submit this information to EPA periodically in a simple format should impose minimal additional burden or cost for industry provided that the reporting mechanism is easy to access and use. Such a report would provide regulated entities an opportunity to review their products' compliance with the applicable standards and therefore help to assure compliance.

EPA notes that the VOC composition of coatings subject to this proposed rule is "emissions data" under section 114 of the CAA, and EPA's regulatory definition of such term in 40 CFR part 2, because the information is necessary to determine compliance with applicable limits. As such, this information must be available to the public regardless of whether EPA obtains the information through a reporting requirement or through a specific request to the regulated entity. Therefore, such information is not eligible for treatment as "confidential business information" under proposed section 59.516.

We specifically solicit comment on the following questions related to the initial report and any potential periodic reporting requirement for information related to VOC composition of products subject to this rule: (1) Whether there is a need for such a reporting requirement to allow for more effective implementation and enforcement of the regulation; and (2) what specific contents should be required in such reports. With respect to any potential periodic reporting requirement, we also request comment on what frequency or under what circumstances such reporting should be required. As to the mechanism or method for submitting initial or periodic reports to EPA, we specifically solicit comment on whether, given the nature of the reports under consideration, it would be advantageous for regulated entities to

submit reports electronically. Electronic reporting to a centralized electronic database could help to decrease the burden and cost to regulated entities. A database of composition information would also help EPA track the effect of the rule on VOC emissions composition and provide information that is necessary for effective implementation and enforcement of the rule. For each of these questions, EPA solicits comment regarding the burdens and cost that reporting requirements might impose, and what EPA could do to minimize the burdens and cost, especially with respect to small entities.

We are proposing an exemption from the limits of the rule for those entities that manufacture only a small amount of aerosol coatings. We believe that this exemption will serve to mitigate the impacts of the rule upon small manufacturers for whom compliance with the rule could impose disproportionately high costs through reformulation of products produced only in small volumes. Given this objective, and in order to avoid unnecessary excess VOC emissions that could be significant in the aggregate, we are proposing that this exemption from the limits would be available only for those manufacturers that have annual production of aerosol coatings products with total VOC content not in excess of 7,500 kg of VOC in all aerosol coating product categories. We emphasize that this to be determined by total VOC content by mass, in all product categories manufactured by the entity. We consider making this distinction based upon total VOC mass, rather than some reactivity-adjusted calculation, necessary both to minimize the analytical impacts upon the entity seeking the exemption from the rule, and to provide for more effective implementation and enforcement of this aspect of the rule.

A manufacturer that qualifies for the exemption must notify EPA of this in the initial notification report required in proposed section 59.511. As a condition for the exemption from the limits, the proposed rule also requires the entity to file an annual report with EPA providing the information necessary to evaluate and to establish that the products manufactured by the entity are properly exempt from the limits of rule. This information is necessary to assure that the entity is in compliance, even if its products do not meet the limits of the rule. EPA notes that an exemption under EPA's national rule for aerosol coatings under section 183(e) does not alter any requirements under any applicable state or local regulations.

We specifically request comment on whether there is a need for an exemption of this type for very small manufacturers. In addition, we request comment on the features of the exemption as we have proposed it. Finally, in order to get better information about the number of manufacturers that would potentially use such an exemption, we specifically request that interested commenters indicate whether they would elect to use the exemption from the limits.

The proposed rule requires all regulated entities to comply by January 1, 2009. EPA believes that compliance by this date is readily achievable by most, if not all, regulated entities subject to this rule. However, in the case of regulated entities that have not previously met the limits already imposed by regulation in the State of California, EPA believes that it may be appropriate to provide an extension of the compliance date on a case by case basis. Therefore, the proposed rule includes a provision that will allow regulated entities that have not previously manufactured, imported, or distributed for sale or distribution in California any product in any category listed in Table 1 of this subpart that complies with applicable California regulations for aerosol coatings to seek an extension of the compliance date. Such extensions will be granted at the discretion of the Administrator. The grant or denial of a compliance date extension does not affect the right of the regulated entity to seek a variance under this rule.

H. Variance Criteria

The proposed ACRR includes a variance provision. Companies may require a variance for several reasons. The regulated entity may be responsible for a coating that has more extensive performance requirements than other coatings in the category so that reformulating that coating to meet the reactivity limits is more difficult than it is for other coatings. In some cases, a regulated entity may experience an interruption in the supply of a particular compound necessary to the performance of a coating due to a fire or other exceptional event at the supplier's facility. Furthermore, small companies may require longer to reformulate a coating due to limited resources. The proposed rule requires regulated entities to submit a written application to the Administrator requesting a variance if, for reasons beyond their reasonable control, they cannot comply with the requirements of the proposed rule. The application must include the following information:

- (1) The specific products for which the variance is sought;
- (2) The specific provisions of the subpart for which the variance is sought;
- (3) The specific grounds upon which the variance is sought;
- (4) The proposed date(s) by which compliance with the provisions of the rule will be achieved; and
- (5) A compliance plan detailing the method(s) by which compliance will be achieved.

Upon receipt of the variance application, the Administrator will determine whether a variance is warranted.

The Administrator may grant a variance if the following criteria are met:

- (1) Complying with the provisions of this subpart would not be technologically or economically feasible.
- (2) The compliance plan proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

The approved variance order will designate a final compliance date and a condition that specifies increments of progress necessary to assure timely compliance. A variance shall end immediately upon the failure of the regulated entity to comply with any term or condition of the variance.

The EPA understands that some regulated entities may face more challenges in meeting the limits of the regulation than others. Therefore, the Administrator will carefully evaluate requests from regulated entities' facilities, particularly small businesses that have not marketed their products in regulated areas prior to this rulemaking.

I. Test Methods

To demonstrate compliance with the proposed reactivity limits, it is necessary to identify the species of reactive organic compounds that are present in the coating and the percent weight of each compound. While regulated entities may use formulation data to demonstrate compliance with this rule, the rule requires that the results of calculations using formulation data be consistent with results of calculations obtained from approved test methods. CARB's Method 310 is the primary test method we have included in the regulation for demonstrating compliance with the reactivity limits. Method 310 is essentially a compendium of methods developed by other agencies (for example, ASTM, U.S. EPA, NIOSH) that focus on identifying and quantifying the components of an aerosol coating. Manufacturers and

regulatory agencies using Method 310 to determine the compliance status of a coating must select the appropriate methods from Method 310 that will ensure the necessary data are generated. There is no one method that will provide the necessary data. For example, as a minimum, it will be necessary to use one of the ASTM methods referenced in Method 310 to separate the propellant from the liquid portion of the coating and another method, or in some cases, multiple methods, to analyze the propellant and liquid portions for VOC content. Although Method 310 is complex, EPA believes that it is an appropriate method to incorporate into the aerosol coatings regulation. The method has been used in California to demonstrate compliance with the reactivity limits developed for aerosol coatings in that state and EPA believes it is an effective method for demonstrating compliance with this regulation. [Other issues associated with this method are identified in a memorandum included in the docket to this rule (EPA-HQ-OAR-2006-0971)].

We have also included EPA's Test Method 311—Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings—as an alternative test method to CARB's Method 310. Aerosol coating manufacturers and regulatory agencies can elect to use Method 311 to demonstrate compliance with the reactivity limits. As the title of Method 311 suggests, EPA originally developed this method to analyze the HAP content of coatings. However, EPA believes that the method is applicable to the identification and quantification of organic compounds that may be present in aerosol coatings.

As with Method 310, it is necessary that the analyst be provided with a list of the compounds in the coating so that the analyst can properly calibrate the gas chromatograph that will be used for the analysis. Because Method 311 was developed specifically for the analysis of coatings, it is in many ways a simpler and more straightforward method than 310. The results from Method 311 are based on percent by weight, so it is not necessary to convert the results to another metric. The sample preparation instructions in Method 311, with the exception of the aerosol portion of the coating, do not require any adjustments since they were specifically developed for the analysis of liquid samples. We know of no reason why the data collected using Method 311 should be any less accurate than those collected using Method 310. For these reasons, we have decided to include Method 311 as an alternative to Method 310.

Because Method 311 was developed for the analysis of liquid coatings and aerosol coatings containing both liquid and gaseous components, those electing to use Method 311 must also use either ASTM Method D3063-94 or D3074-94 to collect the propellant for analysis. As discussed earlier, this is also true for those running Method 310. The only difference is that the ASTM methods are specifically referenced in Method 310.

V. Statutory and Executive Order (EO) Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is a "significant regulatory action" since it raises novel legal or policy issues. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

B. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. The Information Collection Request (ICR) document prepared by EPA has been assigned EPA ICR number 2266.01.

The information collection requirements are based on recordkeeping and reporting requirements. These recordkeeping and reporting requirements are specifically authorized by CAA section 114 (42 U.S.C. 7414). All information submitted to EPA pursuant to the recordkeeping and reporting requirements for which a claim of confidentiality is made is safeguarded according to Agency policies set forth in 40 CFR part 2, subpart B.

The proposed standards would require regulated entities to submit an initial notification and other reports as outlined in section IV.F.

We estimate that about 62 regulated entities would be subject to the proposed standards. New and existing regulated entities would have no capital costs associated with the information collection requirements in the proposed standards.

The estimated recordkeeping and reporting burden in the 3rd year after the effective date of the promulgated rule is estimated to be 7986 labor hours at a cost of \$472,386.00. This estimate includes the cost of reporting, including

reading instructions, information gathering, preparation of initial and supplemental reports, and variance applications. Recordkeeping cost estimates include reading instructions, planning activities, calculation of reactivity, and maintenance of batch information. The average hours and cost per regulated entity would be 128 hours and \$7,619.00. About 62 facilities would respond per year.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9.

To comment on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques, EPA has established a public docket for this rule, which includes this ICR, under Docket ID number EPA-HQ-OAR-2006-0971. Submit any comments related to the ICR for this proposed rule to EPA and OMB. See **ADDRESSES** section at the beginning of this notice for where to submit comments to EPA. Send comments to OMB at the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, Attention: Desk Officer for EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after July 16, 2007 in the **Federal Register**, a comment to OMB is best assured of having its full effect if OMB receives it by August 15, 2007 in the **Federal Register**. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of this proposed rule on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration's (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district, or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of this proposed regulatory action, I certify that this action will not have a significant economic impact on a substantial number of small entities because the cost to sales ratio is small for all of the facilities owned by small entities. The small entities directly regulated by this proposed rule are small manufacturers, processors, wholesale distributors, or importers of aerosol coatings for sale or distribution in interstate commerce in the United States. Our analysis indicates that all 43 of the identified small entities (seventy-two percent of all identified facilities) will likely experience a cost impact of less than one percent of revenues.

Although this proposed rule will not have a significant economic impact on a substantial number of small entities, EPA nonetheless has tried to reduce the impact of this rule on small entities in two ways. First, the proposed rule considers issuance of a special compliance extension that extends the date of compliance by two years for regulated entities that have never manufactured, imported, or distributed aerosol coatings for sale or distribution in California in compliance with California's Regulation for Reducing Ozone Formed from Aerosol Coating Product Emissions, Title 17, California Code of Regulations, Sections 94520–94528. Finally, the proposed rule includes an exemption from the limits in Table 1 of subpart E of the rule for those manufacturers that manufacture very limited amounts of aerosol

coatings, i.e., products with a total VOC content by mass of no more than 7,500 kilograms of VOC per year in the aggregate for all products. We continue to be interested in the potential impacts of the proposed rule on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with “Federal mandates” that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of \$100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives, and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that the proposed regulatory action does not contain a Federal mandate that may result in expenditures of \$100 million or more for State, local, or tribal governments, in the aggregate, or the private sector in any one year. Thus, this proposed action is not subject to the requirements of sections 202 and 205 of the UMRA. In addition, we have determined that the proposed regulatory

action contains no regulatory requirements that might significantly or uniquely affect small governments because they contain no regulatory requirements that apply to such governments or impose obligations upon them. Therefore, this action is not subject to the requirements of section 203 of UMRA.

E. Executive Order 13132: Federalism

Executive Order 13132, entitled “Federalism” (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure “meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.” “Policies that have federalism implications” is defined in the EO to include regulations that have “substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.”

The proposed regulatory action does not have federalism implications. The action does not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in EO 13132. The CAA establishes the relationship between the Federal Government and the States, and this action does not impact that relationship. Thus, EO 13132 does not apply to the proposed regulatory action. However, in the spirit of EO 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA is soliciting comment on the proposed regulatory action from State and local officials.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

EO 13175, entitled “Consultation and Coordination with Indian Tribal Governments” (65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure “meaningful and timely input by Tribal officials in the development of regulatory policies that have Tribal implications.”

The proposed action does not have Tribal implications as defined by EO 13175. The proposed regulatory action does not have a substantial direct effect on one or more Indian Tribes, in that the proposed action imposes no regulatory burdens on tribes. Furthermore, the proposed action does not affect the relationship or distribution of power

and responsibilities between the Federal Government and Indian Tribes. The CAA and the Tribal Authority Rule (TAR) establish the relationship of the Federal Government and Tribes in implementing the Clean Air Act. Because the proposed rule does not have Tribal implications, EO 13175 does not apply.

G. Executive Order 13045: Protection of Children from Environmental Health and Safety Risks

Executive Order 13045, "Protection of Children from Environmental Health and Safety Risks" (62 FR 19885, April 23, 1997) applies to any rule that (1) is determined to be "economically significant" as defined under EO 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, section 5B501 of the EO directs the Agency to evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

The proposed regulatory action is not subject to Executive Order 13045 because it is not an economically significant regulatory action as defined by Executive Order 12866. In addition, EPA interprets Executive Order 13045 as applying only to those regulatory actions that are based on health and safety risks, such that the analysis required under section 5-501 of the Executive Order has the potential to influence the regulations. The proposed regulatory action is not subject to Executive Order 13045 because it does not include regulatory requirements based on health or safety risks.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This rule is not a "significant energy action" as defined in Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355 (May 22, 2001)) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Further, we have concluded that this rule is not likely to have any adverse energy effects.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995 (Pub. L. No. 104-

113, Section 12(d), 15 U.S.C. 272 note) directs EPA to use voluntary consensus standards (VCS) in its regulatory activities, unless to do so would be inconsistent with applicable law or otherwise impractical. The VCS are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by VCS bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency does not use available and applicable VCS.

This proposed rule involves technical standards. The EPA cites the following standards in this rule: California Air Resources Board (ARB) Method 310, "Determination of Volatile Organic Compounds (VOC) in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products;" EPA Method 311 in 40 CFR part 60, appendix B, in conjunction with American Society of Testing and Materials (ASTM) method D3063-94 or D3074-94 for analysis of the propellant portion of the coating; South Coast Air Quality Management District (SCAQMD) method 318-95, "Determination of Weight Percent Elemental Metal in Coatings by X-ray Diffraction" for metal content; ASTM D523-89 (1999) for specular gloss of flat and nonflat coatings; and ASTM D1613-03, "Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products" for acid content of rust converters.

The EPA Method 311 also is a compilation of voluntary consensus standards. The following are incorporated by reference in Method 311: ASTM D1979-91, ASTM D3432-89, ASTM D4457-85, ASTM D4747-87, ASTM D4827-93, and ASTM PS9-94.

Consistent with the NTTAA, EPA conducted searches to identify voluntary consensus standards in addition to these methods. No applicable voluntary consensus standards were identified.

For the methods required by the proposed rule, a source may apply to EPA for permission to use alternative test methods or alternative monitoring requirements in place of any required testing methods, performance specifications, or procedures under sections 63.7(f) and 63.8(f) of Subpart A of the General Provisions.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (EO) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes federal

executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this proposed rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income populations. Further, it establishes national emission standards for VOC in aerosol coatings.

List of Subjects

40 CFR Part 51

Environmental protection, Administrative practice and procedure, Air pollution control, Carbon monoxide, Intergovernmental relations, Lead, Nitrogen dioxide, Ozone, Particulate matter, Reporting and recordkeeping requirements, Sulfur oxides, Volatile organic compound.

40 CFR Part 59

Environmental protection, Administrative practice and procedure, Air pollution control, Intergovernmental relations, Reporting and recordkeeping requirements, Consumer products, Aerosol coatings.

Dated: June 29, 2007.

Stephen L. Johnson,
Administrator.

For the reasons set out in the preamble, part 59 of title 40 of the Code of Federal Regulations is proposed to be amended as follows:

PART 51—[AMENDED]

1. The authority citation for Part 51 continues to read as follows:

Authority: 23 U.S.C. 101; 42 U.S.C. 7401-7671q.

2. Section 51.100 is amended by adding paragraph (s)(7) to read as follows:

§ 51.100 Definitions.

* * * * *

(s) * * *

(7) For the purposes of determining compliance with EPA's aerosol coatings

reactivity based regulation (as described in Part 59—National Volatile Organic Compound Emission Standards for Consumer and Commercial Products) any organic compound in the volatile portion of an aerosol coating is counted towards the product's reactivity-based limit. Therefore, the compounds identified in paragraph (s) of this section as negligibly reactive and excluded from EPA's definition of VOC are to be counted towards a product's reactivity limit for the purposes of determining compliance with EPA's aerosol coatings reactivity-based national regulation.

* * * * *

PART 59—[AMENDED]

3. The authority citation for part 59 continues to read as follows:

Authority: 42 U.S.C. 7414 and 7511b(e).

4. Subpart E is added to read as follows:

Subpart E—National Volatile Organic Compound Emission Standards for Aerosol Coatings

Sec.

59.500 What is the purpose of this subpart?

59.501 Am I subject to this subpart?

59.502 When do I have to comply with this subpart?

59.503 What definitions apply to this subpart?

59.504 What limits must I meet?

59.505 How do I demonstrate compliance with the reactivity limits?

59.506 How do I demonstrate compliance if I manufacture multi-component kits?

59.507 What are the labeling requirements for aerosol coatings?

59.508 What test methods must I use?

59.509 Can I get a variance?

59.510 What records am I required to maintain?

59.511 What reports must I submit?

59.512 Addresses of EPA regional offices.

59.513 State authority.

59.514 Circumvention.

59.515 Incorporations by reference.

59.516 Availability of information and confidentiality

Table 1 to Subpart E to Part 59—Product-Weighted Reactivity Limits by Coating Category

Table 2A to Subpart E to Part 59—Reactivity Factors

Table 2B to Subpart E to Part 59—Reactivity Factors for Aliphatic Hydrocarbon Solvent Mixtures

Table 2C to Subpart E to Part 59—Reactivity Factors for Aromatic Hydrocarbon Solvent Mixtures

Subpart E—National Volatile Organic Compound Emission Standards for Aerosol Coatings

§ 59.500 What is the purpose of this subpart?

This subpart establishes the product weighted reactivity (PWR) limits regulated entities must meet to in order to comply with the national rule for volatile organic compounds emitted from aerosol coatings. This subpart also establishes labeling, and recordkeeping and reporting requirements for regulated entities.

§ 59.501 Am I subject to this subpart?

(a) You are a regulated entity under this rule and subject to this subpart if you are listed in either paragraph (a)(1) or (a)(2) of this section.

(1) Manufacturers, processors, wholesale distributors, or importers of aerosol coatings for sale or distribution in interstate commerce in the United States; or

(2) Manufacturers, processors, wholesale distributors, or importers that supply the entities listed in paragraph (a)(1) with such products for sale or distribution in interstate commerce in the United States.

(b) Except as provided in paragraph (e) of this section, as a manufacturer or importer of the product, you are subject to the product weighted reactivity limits presented in § 59.504 even if you are not named on the label. If you are a distributor named on the label, you are responsible for compliance with all sections of this subpart except for the limits presented in § 59.504.

Distributors that are not named on the label are not subject to this subpart. If there is no distributor named on the label, then the manufacturer or importer is responsible for complying with all sections of this subpart.

(c) Except as provided in paragraph (e) of this section, the provisions of this subpart apply to aerosol coatings manufactured on or after January 1, 2009 for sale or distribution in the United States.

(d) You are not a regulated entity under this subpart if you manufacture coatings (in or outside of the United States) that are exclusively for sale outside the United States.

(e) If you are a manufacturer of aerosol coatings but the total amount of VOC by mass in the products you manufacture, in the aggregate, is less than 7,500 kg per year, then the products you manufacture in such year are exempt from the product-weighted reactivity limits presented in § 59.504, so long as you are in compliance with the other applicable provisions of this subpart.

§ 59.502 When do I have to comply with this subpart?

(a) Except as provided in § 59.509 and paragraph (b) of this section, you must be in compliance with all provisions of this subpart by January 1, 2009.

(b) The Administrator will consider issuance of a special compliance extension that extends the date of compliance until January 1, 2011, to regulated entities that have never manufactured, imported, or distributed aerosol coatings for sale or distribution in California in compliance with California's Regulation for Reducing Ozone Formed from Aerosol Coating Product Emissions, Title 17, California Code of Regulations, Sections 94520–94528. In order to be considered for an extension of the compliance date, you must submit a special compliance extension application to the EPA Administrator no later than 90 days before the compliance date or within 90 days before the date that you first manufacture aerosol coatings, whichever is later. This application must contain the information in paragraphs (b)(1) through (b)(5) of the section:

(1) Company name;

(2) A signed certification by a responsible company official that the regulated entity has not at any time manufactured, imported, or distributed for sale or distribution in California any product in any category listed in Table 1 of this subpart that complies with California's Regulation for Reducing Ozone Formed From Aerosol Coating Product Emissions, Title 17, California Code of Regulations, Sections 94520–94528;

(3) A statement that the regulated entity will, to the extent possible within its reasonable control, take appropriate action to achieve compliance with this subpart by January 1, 2011;

(4) A list of the product categories in Table 1 of this subpart that the regulated entity manufactures, imports, or distributes; and,

(5) Name, title, address, telephone, e-mail address, and signature of the certifying company official.

(6) If a regulated entity remains unable to comply with the limits of this rule by January 1, 2011, the regulated entity may seek a variance in accordance with § 59.509.

§ 59.503 What definitions apply to this subpart?

The following terms are defined for the purposes of this subpart only.

Administrator means the Administrator of the United States Environmental Protection Agency (U.S. EPA) or an authorized representative.

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/marketing applications. For the purpose of this regulation, applicable aerosol coatings categories are listed in Table 1 of this subpart.

Art Fixative or Sealant means a clear coating, including art varnish, workable art fixative, and ceramic coating, which is designed and labeled exclusively for application to paintings, pencil, chalk, or pastel drawings, ceramic art pieces, or other closely related art uses, in order to provide a final protective coating or to fix preliminary stages of artwork while providing a workable surface for subsequent revisions. ASTM means the American Society for Testing and Materials.

Autobody Primer means an automotive primer or primer surfacer coating designed and labeled exclusively to be applied to a vehicle body substrate for the purposes of corrosion resistance and building a repair area to a condition in which, after drying, it can be sanded to a smooth surface.

Automotive Bumper and Trim Product means a product, including adhesion promoters and chip sealants, designed and labeled exclusively to repair and refinish automotive bumpers and plastic trim parts.

Aviation Propeller Coating means a coating designed and labeled exclusively to provide abrasion resistance and corrosion protection for aircraft propellers. Aviation or Marine Primer means a coating designed and labeled exclusively to meet federal specification TT-P-1757.

Clear Coating means a coating which is colorless, containing resins but no pigments except flattening agents, and is designed and labeled to form a transparent or translucent solid film.

Coating Solids means the nonvolatile portion of an aerosol coating product, consisting of the film forming ingredients, including pigments and resins.

Commercial Application means the use of aerosol coating products in the production of goods, or the providing of services for profit, including touch-up and repair.

Corrosion Resistant Brass, Bronze, or Copper Coating means a clear coating designed and labeled exclusively to prevent tarnish and corrosion of uncoated brass, bronze, or copper metal surfaces.

Distributor means any person to whom an aerosol coating product is sold or supplied for the purposes of resale or distribution in commerce, except that manufacturers, retailers, and consumers are not distributors.

Enamel means a coating which cures by chemical cross-linking of its base resin and is not resolvable in its original solvent.

Engine Paint means a coating designed and labeled exclusively to coat engines and their components.

Exact Match Finish, Automotive means a topcoat which meets all of the following criteria:

(1) The product is designed and labeled exclusively to exactly match the color of an original, factory-applied automotive coating during the touch-up of automobile finishes;

(2) The product is labeled with the manufacturer's name for which they were formulated; and

(3) The product is labeled with one of the following:

(i) The original equipment manufacturer's (O.E.M.) color code number;

(ii) The color name; or

(iii) Other designation identifying the specific O.E.M. color to the purchaser.

Notwithstanding the foregoing, automotive clear coatings designed and labeled exclusively for use over automotive exact match finishes to replicate the original factory applied finish shall be considered to be automotive exact match finishes.

Exact Match Finish, Engine Paint means a coating which meets all of the following criteria:

(1) The product is designed and labeled exclusively to exactly match the color of an original, factory-applied engine paint;

(2) The product is labeled with the manufacturer's name for which they were formulated; and

(3) The product is labeled with one of the following:

(i) The original equipment manufacturer's (O.E.M.) color code number;

(ii) The color name; or

(iii) Other designation identifying the specific original equipment manufacturer (O.E.M.) color to the purchaser.

Exact Match Finish, Industrial means a coating which meets all of the following criteria:

(1) The product is designed and labeled exclusively to exactly match the color of an original, factory-applied industrial coating during the touch-up of manufactured products;

(2) The product is labeled with the manufacturer's name for which they were formulated; and

(3) The product is labeled with one of the following:

(i) O.E.M. color code number; (ii) the color name; or (iii) other designation identifying the specific O.E.M. color to the purchaser.

Flat Paint Products means a coating which, when fully dry, registers specular gloss less than or equal to 15 on an 85° gloss meter, or less than or equal to 5 on a 60° gloss meter, or which is labeled as a flat coating.

Flattening Agent means a compound added to a coating to reduce the gloss of the coating without adding color to the coating.

Floral Spray means a coating designed and labeled exclusively for use on fresh flowers, dried flowers, or other items in a floral arrangement for the purposes of coloring, preserving or protecting their appearance.

Fluorescent Coating means a coating labeled as such, which converts absorbed incident light energy into emitted light of a different hue.

Glass Coating means a coating designed and labeled exclusively for use on glass or other transparent material to create a soft, translucent light effect, or to create a tinted or darkened color while retaining transparency.

Ground Traffic/Marking Coating means a coating designed and labeled exclusively to be applied to dirt, gravel, grass, concrete, asphalt, warehouse floors, or parking lots. Such coatings must be in a container equipped with a valve and spray head designed to direct the spray toward the surface when the can is held in an inverted vertical position.

High Temperature Coating means a coating, excluding engine paint, which is designed and labeled exclusively for use on substrates which will, in normal use, be subjected to temperatures in excess of 400°F.

Hobby/Model/Craft Coating means a coating which is designed and labeled exclusively for hobby applications and is sold in aerosol containers of 6 ounces by weight or less.

Impurity means an individual chemical compound present in a raw material which is incorporated in the final aerosol coatings formulation, if the compound is present in amounts below the following in the raw material:

(1) For individual compounds that are carcinogens each compound must be present in an amount less than 0.1 percent by weight;

(2) For all other compounds present in a raw material, a compound must be present in an amount less than 1 percent by weight.

Ingredient means a component of an aerosol coating product.

Lacquer means a thermoplastic film-forming material dissolved in organic solvent, which dries primarily by solvent evaporation, and is resolvable in its original solvent.

Manufacturer means any person who imports, manufactures, assembles, produces, packages, repackages, or relabels a consumer product.

Marine Spar Varnish means a coating designed and labeled exclusively to provide a protective sealant for marine wood products.

Metallic Coating means a topcoat which contains at least 0.5 percent by weight elemental metallic pigment in the formulation, including propellant, and is labeled as "metallic", or with the name of a specific metallic finish such as "gold", "silver", or "bronze."

Multi-Component Kit means an aerosol spray paint system which requires the application of more than one component (e.g. foundation coat and top coat), where both components are sold together in one package.

Nonflat Paint Product means a coating which, when fully dry, registers a specular gloss greater than 15 on an 85° gloss meter or greater than five on a 60° gloss meter.

Ozone means a colorless gas with a pungent odor, having the molecular form O₃.

Photograph Coating means a coating designed and labeled exclusively to be applied to finished photographs to allow corrective retouching, protection of the image, changes in gloss level, or to cover fingerprints.

Pleasure Craft means privately owned vessels used for noncommercial purposes.

Pleasure Craft Finish Primer/Surfacer/Undercoater means a coating designed and labeled exclusively to be applied prior to the application of a pleasure craft topcoat for the purpose of corrosion resistance and adhesion of the topcoat, and which promotes a uniform surface by filling in surface imperfections.

Pleasure Craft Topcoat means a coating designed and labeled exclusively to be applied to a pleasure craft as a final coat above the waterline and below the waterline when stored out of water. This category does not include clear coatings.

Polyolefin Adhesion Promoter means a coating 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.

Primer means a coating labeled as such, which is designed to be applied to

a surface to provide a bond between that surface and subsequent coats.

Product Weighted Reactivity (PWR) Limit means the maximum "product-weighted reactivity," as calculated in § 59.505, allowed in an aerosol coating product that is subject to the limits specified in § 59.504 for a specific category, expressed as g O₃/g product.

Propellant means a liquefied or compressed gas that is used in whole or in part, such as a co-solvent, to expel a liquid or any other material from the same self-pressurized container or from a separate container.

Reactivity Factor (RF) is a measure of the change in mass of ozone formed by adding a gram of a VOC to the ambient atmosphere, expressed to hundredths of a gram (g O₃/g VOC). The RF values for individual compounds and hydrocarbon solvents are specified in Tables 2A, 2B, and 2C of this subpart.

Regulated Entity means the company, firm, or establishment which is listed on the product's label. If the label lists two companies, firms or establishments, the responsible party is the party which the product was "manufactured for" or "distributed by", as noted on the label.

Retailer means any person who sells, supplies, or offers aerosol coating products for sale directly to consumers.

Retail Outlet means any establishment where consumer products are sold, supplied, or offered for sale, directly to consumers.

Shellac Sealer means a clear or pigmented coating formulated solely with the resinous secretion of the lac beetle (*Laccifer lacca*), thinned with alcohol, and formulated to dry by evaporation without a chemical reaction.

Slip-Resistant Coating means a coating designed and labeled exclusively as such, which is formulated with synthetic grit and used as a safety coating.

Spatter Coating/Multicolor Coating means a coating labeled exclusively as such wherein spots, globules, or spatters of contrasting colors appear on or within the surface of a contrasting or similar background.

Stain means a coating which is designed and labeled to change the color of a surface but not conceal the surface.

Vinyl/Fabric/Leather/Polycarbonate Coating means a coating designed and labeled exclusively to coat vinyl, fabric, leather, or polycarbonate substrates or to coat flexible substrates including rubber or thermoplastic substrates.

Volatile Organic Compound (VOC) means any organic compound as defined in § 51.100(s) of this chapter. Exemptions from the definition of VOC

in § 51.100(s)(1) are inapplicable for purposes of this subpart.

Webbing/Veiling Coating means a coating designed and labeled exclusively to provide a stranded to spider webbed appearance when applied.

Weight Fraction means the weight of an ingredient divided by the total net weight of the product, expressed to thousandths of a gram of ingredient per gram of product (excluding container and packaging).

Weld-Through Primer means a coating designed and labeled exclusively to provide a bridging or conducting effect for corrosion protection following welding.

Wood Stain means a coating which is formulated to change the color of a wood surface but not conceal the surface.

Wood Touch-Up/Repair/Restoration means a coating designed and labeled exclusively to provide an exact color or sheen match on finished wood products.

Working Day means any day between Monday and Friday, inclusive, except for days that are federal holidays.

§ 59.504 What limits must I meet?

(a) Except as provided in § 59.509, each aerosol coating product you manufacture or import for sale or use in the United States must meet the PWR limits presented in Table 1 of this subpart. These limits apply to the final aerosol coating, including the propellant. The PWR limits specified in Table 1 of this subpart are also applicable to any aerosol coating product that is assembled by adding bulk coating to aerosol containers of propellant.

(b) If a product can be included in both a general coating category and a specialty coating category, and the product meets all of the criteria of the specialty coating category, then the specialty coating limit will apply instead of the general coating limit, unless the product is a high temperature coating. High-temperature coatings that contain at least 0.5 percent by weight of an elemental metallic pigment in the formulation, including propellant, are subject to the limit specified for metallic coatings.

(c) Except as provided in paragraph (b) of this section, if anywhere on the container of any aerosol coating product subject to the limits in Table 1 of this subpart, or on any sticker or label affixed to such product, or in any sales or advertising literature, the manufacturer, importer or distributor of the product makes any representation that the product may be used as, or is

suitable for use as a product for which a lower limit is specified, then the lowest applicable limit will apply.

§ 59.505 How do I demonstrate compliance with the reactivity limits?

(a) To demonstrate compliance with the PWR limits presented in Table 1 of this subpart, you must calculate the product weighted reactivity (PWR) for

each coating as described in paragraphs (a)(1) through (2) of this section:

(1) Calculate the weighted reactivity factor (WRF) for each propellant and coating component using Equation 1:

$$\text{WRF}_i = \text{RF}_i \times \text{WF}_i \quad \text{Equation 1}$$

Where:

$$\text{PWR}_p = (\text{WRF})_1 + (\text{WRF})_2 + \dots + (\text{WRF})_n \quad \text{Equation 2}$$

Where:

PWR_p = Product weighted reactivity for product P, g O₃/g product.

WRF_1 = weighted reactivity factor for component 1, g O₃/g component.

WRF_2 = weighted reactivity factor for component 2, g O₃/g component.

WRF_n = weighted reactivity factor for component n, g O₃/g component.

(b) In calculating the PWR you should follow the guidelines in paragraphs (b)(1) through (b)(3) of this section.

(1) Any ingredient which does not contain carbon is assigned a RF value of 0.

(2) Any aerosol coating solid, including but not limited to resins, pigments, fillers, plasticizers, and extenders is assigned a RF of 0. These items do not have to be identified individually in the calculation.

(3) All individual compounds present in the coating in an amount equal to or exceeding 0.1 percent will be considered ingredients regardless of whether or not the ingredient is reported to the manufacturer.

(4) Any component that is a VOC but is not listed in Table 2A, 2B, or 2C of this subpart is assigned the maximum RF value for all compounds listed in Table 2A, 2B, or 2C of this subpart.

(c) You may use either formulation data (including information for both the liquid and propellant phases), CARB's Method 310 [Determination of Volatile Organic Compounds (VOC) in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products], or EPA's Method 311 [Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings] of 40 CFR part 63 to calculate the Product Weighted Reactivity. However, if there are inconsistencies between the formulation data and the Method 310 or Method 311 results, the Method 310 or 311 results will govern.

(d) If you manufacture a coating containing either an aromatic or aliphatic hydrocarbon solvent mixture, you may use the appropriate reactivity factor for that mixture provided in Table 2B or 2C of this subpart when

calculating the PWR using formulation data. However, when calculating the PWR for a coating containing these mixtures using data from EPA Method 310 of 40 CFR part 63 or CARB Method 311, you must identify the individual compounds that are present in the solvent mixture and use the weight fraction of those individual compounds and their reactivity factors from Table 2A of this subpart in the calculation.

(e) If a VOC is not listed in Table 2A, 2B, or 2C of this subpart, the Reactivity Factor is assumed to be 22.04 g O₃/g VOC. Regulated entities may petition the Administrator to add a compound to Table 2A, 2B, or 2C of this subpart. Petitions should provide adequate data for the Administrator to evaluate the reactivity of the compound and assign a RF value consistent with the values for the other compounds listed in Table 2 of this subpart.

(f) In calculating the PWR value for a coating containing an aromatic hydrocarbon solvent with a boiling range different from the ranges specified in Table 2C of this subpart, you must assign a reactivity factor as described in paragraphs (f)(1) and (f)(2) of this section:

(1) If the solvent boiling point is lower than or equal to 420 degrees F, then you should use the reactivity factor in Table 2C of this subpart specified for bin 3;

(2) If the solvent boiling point is higher than 420 degrees F, then you should use the reactivity factor specified in Table 2C of this subpart for bin 24.

(g) For purposes of compliance with the PWR limits, all VOC compounds must be included in the calculation. The exemptions from the definition of VOC in § 59.100(s)(1) are inapplicable for purposes of this subpart.

§ 59.506 How do I demonstrate compliance if I manufacture multi-component kits?

(a) If you manufacture multi-component kits as defined in § 59.503, then the Kit Product Weighted Reactivity must not exceed the Total Reactivity Limit.

WRF_i = Weighted reactivity factor of component i, g O₃/g component i.

RF_i = reactivity factor of component i, g O₃/g component i, from Table 2A, 2B, or 2C.

WF_i = weight fraction of component i in the product.

(2) Calculate the product weighted reactivity (PWR) of each product using Equation 2:

(b) You can calculate the Kit Product Weighted Reactivity and the Total Reactivity Limit as follows:

(1) $\text{KIT PWR} = (\text{PWR}_{(1)} \times \text{W}_1) + (\text{PWR}_{(2)} \times \text{W}_2) + \dots + (\text{PWR}_{(n)} \times \text{W}_n)$

(2) $\text{Total Reactivity Limit} = (\text{RL}_1 \times \text{W}_1) + (\text{RL}_2 \times \text{W}_2) + \dots + (\text{RL}_n \times \text{W}_n)$.

(3) $\text{Kit PWR} \leq \text{Total Reactivity Limit}$.

Where:

W = The weight of the product contents (excluding container)

RL = the Product Weighted Reactivity Limit specified in Table 1 of this subpart.

Subscript 1 denotes the first component product in the kit

Subscript 2 denotes the second component product in the kit

Subscript n denotes any additional component product

§ 59.507 What are the labeling requirements for aerosol coatings?

(a) Aerosol coatings manufactured after January 1, 2009 must be labeled with the following information:

(1) The aerosol coating category or category code shown in Table 1 of this subpart, as defined in § 59.503;

(2) The applicable PWR limit for the product specified in Table 1 of this subpart;

(3) The day, month, and year on which the product was manufactured, or a code indicating such date;

(4) The name and a contact address for the manufacturer, distributor, or importer that is the regulated entity under this rule.

(b) The label on the product must be displayed in such a manner that it is readily observable without removing or disassembling any portion of the product container or packaging. The information may be displayed on the bottom of the container as long as it is clearly legible without removing any product packaging.

§ 59.508 What test methods must I use?

(a) Except as provided in § 59.505(c), you must use the procedures in CARB's Method 310 [Determination of Volatile Organic Compounds (VOC) in Consumer Products and Reactive Organic Compounds in Aerosol Coating

Products] or EPA's Method 311 [Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings] to determine the speciated ingredients and weight percentage of each ingredient of each aerosol coating product. Method 311 should be used in conjunction with ASTM Method D3063-94 or D3074-94 for analysis of the propellant portion of the coating. Those choosing to use Method 310 should follow the procedures specified in section 5.0 of that method with the exception of section 5.3.1, which requires the analysis of the VOC content of the coating. For the purposes of this regulation, you are not required to determine the VOC content of the aerosol coating. For both Method 310 and Method 311, you must have a listing of the VOC ingredients in the coating before conducting the analysis.

(b) To determine the metal content of metallic aerosol coating products, you must use SCAQMD Method 318-95, "Determination of Weight Percent Elemental Metal in Coatings by X-ray Diffraction."

(c) To determine the specular gloss of flat and nonflat coatings you must use ASTM Method D-523-89 (1999).

(d) To determine the acid content of rust converters you must use ASTM Method D-1613-03, "Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products."

§ 59.509 Can I get a variance?

(a) Any regulated entity that cannot comply with the requirements of this subpart because of circumstances beyond its reasonable control may apply in writing to the Administrator for a temporary variance. The variance application must include the information specified in paragraphs (a)(1) through (a)(5) of this section.

(1) The specific products for which the variance is sought.

(2) The specific provisions of the subpart for which the variance is sought.

(3) The specific grounds upon which the variance is sought.

(4) The proposed date(s) by which the regulated entity will achieve compliance with the provisions of this subpart. This date must be no later than 3 years after the issuance of a variance.

(5) A compliance plan detailing the method(s) by which the regulated entity will achieve compliance with the provisions of this subpart.

(b) Within 30 days of receipt of the original application and within 30 days of receipt of any supplementary information that is submitted, the

Administrator will send a regulated entity written notification of whether the application contains sufficient information to make a determination. If an application is incomplete, the Administrator will specify the information needed to complete the application, and provide the opportunity for the regulated entity to submit written supplementary information or arguments to the Administrator to enable further action on the application. The regulated entity must submit this information to the Administrator within 30 days of being notified that its application is incomplete.

(c) Within 60 days of receipt of sufficient information to evaluate the application, the Administrator will send a regulated entity written notification of approval or disapproval of a variance application. This 60-day period will begin after the regulated entity has been sent written notification that its application is complete.

(d) The Administrator will issue a variance if the criteria specified in paragraphs (d)(1) and (d)(2) of this section are met to the satisfaction of the Administrator.

(1) Complying with the provisions of this subpart would not be technologically or economically feasible.

(2) The compliance plan proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

(e) A variance may specify dates by which the regulated entity will achieve increments of progress towards compliance, and will specify a final compliance date by which the regulated entity will achieve compliance with this subpart.

(f) A variance will cease to be effective upon failure of the party to whom the variance was issued to comply with any term or condition of the variance.

§ 59.510 What records am I required to maintain?

(a) Beginning January 1, 2009, you are required to maintain records of the following at the location specified in § 59.511(a)(4) for each product subject to the PWR limits in Table 1 of this subpart: The product category, all product calculations, the Product Weighted Reactivity, and the weight fraction of all ingredients including: Water, solids, each VOC, and any compounds assigned a reactivity factor of zero as specified in § 59.505. If an individual VOC is present in an amount less than 0.1 percent by weight, then it does not need to be reported as an

ingredient. In addition, an impurity that meets the definition provided in § 59.503 does not have to be reported as an ingredient. For each batch of each product subject to the PWR limits, you must maintain records of the date the batch was manufactured, the volume of the batch, the recipe used for formulating the batch, and the number of cans manufactured in each batch and each formulation.

(b) A copy of each notification that you submit to comply with this subpart, the documentation supporting each notification, and a copy of the label for each product.

(c) If you claim the exemption under § 59.501(e), a copy of the initial report and each annual report that you submit to EPA, and the documentation supporting such report.

(d) You must maintain all records required by this subpart for a period of 5 years.

§ 59.511 What reports must I submit?

(a) You must submit an initial notification report no later than 90 days before the compliance date or within 90 days before the date that you first manufacture, distribute, or import aerosol coatings, whichever is later. The initial report must include the information in paragraphs (a)(1) through (a)(6) of this section.

(1) Company name;

(2) Name, title, number, address, telephone number, e-mail address, and signature of certifying company official;

(3) A list of the product categories from Table 1 of this subpart that you manufacture, import or distribute;

(4) The street address of each of your facilities in the United States that is manufacturing, packaging, or importing aerosol coatings that are subject to the provisions of this subpart and the street address where compliance records are maintained for each site, if different;

(5) A description of date coding systems, clearly explaining how the date of manufacture is marked on each sales unit;

(6) For each product category, an explanation of how the manufacturer, distributor, or importer will define a batch for the purpose of the recordkeeping requirements; and

(7) A statement certifying that all products manufactured by the company that are subject to the limits in Table 1 of this subpart will be in compliance with those limits.

(b) If you change any information included in the initial notification report, including the list of aerosol categories, contact information, records location, or the date coding system reported according to paragraph (a)(5) of

this section, you must notify the Administrator of such changes within 30 days following the change.

(c) Upon 60 days written notice, you must submit to the Administrator a written report with all the information in paragraphs (c)(1) through (c)(5) of this section for each product you manufacture, distribute, or import under your name or another company's name.

(1) The brand name of the product;

(2) A copy of the product label;

(3) The owner of the trademark or brand names;

(4) The product category as defined in § 59.503;

(5) Product formulation data for each formulation manufactured including the PWR and the weight fraction of all ingredients including: Water, solids, each VOC present in an amount greater than or equal to 0.1 percent, and any compounds assigned a reactivity factor of zero.

(d) If you claim the exemption under § 59.501(e), you must submit an initial notification report no later than 90 days before the compliance date or within 90 days before the date that you first manufacture aerosol coatings, whichever is later. The initial report must include the information in paragraphs (a)(1) through (a)(6) of this section.

(1) Company name;

(2) Name, title, number, address, telephone number, e-mail address, and signature of certifying company official;

(3) A list of the product categories from Table 1 of this subpart that you manufacture;

(4) The total amount of product you manufacture in each category and the total VOC mass content of such products for the preceding calendar year;

(5) The street address of each of your facilities in the United States that is manufacturing aerosol coatings that are subject to the provisions of this subpart and the street address where compliance records are maintained for each site, if different; and

(6) A list of the States in which you sell or otherwise distribute the products you manufacture.

After the initial report, you must file an annual report for each year in which you claim an exemption from the limits of this subpart. Such annual report must be filed by March 1 of the year following the year in which you manufactured the products. The annual report shall include the same information required in paragraphs (a)(1) through (6) of this section.

§ 59.512 Addresses of EPA regional offices.

All requests (including variance requests), reports, submittals, and other communications to the Administrator pursuant to this regulation shall be submitted to the Regional Office of the EPA which serves the State or territory for the address that is listed on the aerosol coating product in question. These areas are indicated in the following list of EPA Regional Offices.

EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), Director, Office of Environmental Stewardship, Mailcode: SAA, JFK Building, Boston, MA 02203.

EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands), Director, Division of Enforcement and Compliance Assistance, 290 Broadway, New York, NY 10007-1866.

EPA Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia), Air Protection Division, 1650 Arch Street, Philadelphia, PA 19103.

EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), Director, Air, Pesticides and Toxics, Management Division, 345 Courtland Street, NE., Atlanta, GA 30365.

EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Director, Air and Radiation Division, 77 West Jackson Blvd., Chicago, IL 60604-3507.

EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), Director, Air, Pesticides and Toxics Division, 1445 Ross Avenue, Dallas, TX 75202-2733.

EPA Region VII (Iowa, Kansas, Missouri, Nebraska), Director, Air and Toxics Division, 726 Minnesota Avenue, Kansas City, KS 66101.

EPA Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), Director, Air and Toxics Division, 999 18th Street, 1 Denver Place, Suite 500, Denver, Colorado 80202-2405.

EPA Region IX (American Samoa, Arizona, California, Guam, Hawaii, Nevada), Director, Air Division, 75 Hawthorne Street, San Francisco, CA 94105.

EPA Region X (Alaska, Oregon, Idaho, Washington), Director, Air and Toxics Division, 1200 Sixth Avenue, Seattle, WA 98101.

§ 59.513 State authority.

The provisions in this regulation will not be construed in any manner to preclude any State or political subdivision thereof from:

(a) Adopting and enforcing any emission standard or limitation

applicable to a manufacturer, distributor or importer of aerosol coatings or components in addition to the requirements of this subpart.

(b) Requiring the manufacturer, distributor or importer of aerosol coatings or components to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of a facility for manufacturing an aerosol coating or component.

§ 59.514 Circumvention.

Each manufacturer, distributor, and importer of an aerosol coating or component subject to the provisions of this subpart must not alter, destroy, or falsify any record or report, to conceal what would otherwise be noncompliance with this subpart. Such concealment includes, but is not limited to, refusing to provide the Administrator access to all required records and date-coding information, altering the PWR content of a coating or component batch, or altering the results of any required tests to determine the PWR.

§ 59.515 Incorporations by reference.

(a) The following material is incorporated by reference (IBR) in the paragraphs noted in § 59.508. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on the date of approval, and notice of any changes in these materials will be published in the **Federal Register**.

(1) California Air Resources Board Method 310, Determination of Volatile Organic Compounds (VOC) in Consumer Products and Reactive Organic Compounds in Aerosol Coating Products, IBR approved for § 59.508.

(2) South Coast Air Quality Management District (SCAQMD) Test Method 318-95, Determination of Weight Percent Elemental Metal in Coatings by X-ray Diffraction, IBR approved for § 59.508.

(3) ASTM Method D-523-89 (1999), Specular Gloss of Flat and Nonflat Coatings, IBR approved for § 59.508.

(4) ASTM Method D-1613-03, Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Coating, Varnish, Lacquer and Related Products, IBR approved for § 59.508.

(5) EPA Method 311—Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings by Direct Injection into a Gas Chromatograph, IBR approved for § 59.508.

(b) The materials are available for inspection at the National Archives and Records Administration (NARA). For

information on the availability of this material at NARA, call 202-741-6030, or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html; the Air and Radiation Docket and Information Center, U.S. EPA, 401 M Street, SW., Washington, DC; and at the EPA Library (Mail Code C267-07), U.S. EPA, Research Triangle Park, North Carolina.

(c) *Reports and Applications.* The content of all reports and applications required to be submitted to the Agency under § 59.511, § 59.509 or § 59.502 of this subpart are not entitled to protection under section 114(c) of the Clean Air Act.

§ 59.516 Availability of information and confidentiality.

(a) *Availability of information.* The availability to the public of information provided to or otherwise obtained by

the Administrator under this part shall be governed by part 2 of this chapter.

(b) *Confidentiality.* All confidential business information entitled to protection under section 114(c) of the Clean Air Act that must be submitted or maintained by each regulated entity pursuant to this subpart shall be treated in accordance with 40 CFR part 2, subpart B.

Tables to Subpart E

TABLE 1 TO SUBPART E OF PART 59.—PRODUCT-WEIGHTED REACTIVITY LIMITS BY COATING CATEGORY
(g Ozone/g product)

Coating category	Category code	Reactivity limit
Clear Coatings	CCP	1.50
Flat Coatings	FCP	1.20
Fluorescent Coatings	FLP	1.75
Metallic Coatings	MCP	1.90
Non-Flat Coatings	NFP	1.40
Primers	PCP	1.20
Ground Traffic/Marking	GTM	1.20
Art Fixatives or Sealants	AFS	1.80
Auto body primers	ABP	1.55
Automotive Bumper and Trim Products	ABT	1.75
Aviation or Marine Primers	AMP	2.00
Aviation Propellor Coatings	APC	2.50
Corrosion Resistant Brass, Bronze, or Copper Coatings	CRB	1.80
Exact Match Finish—Engine Enamel	EEE	1.70
Exact Match Finish—Automotive	EFA	1.50
Exact Match Finish—Industrial	EFI	2.05
Floral Sprays	FSP	1.70
Glass Coatings	GCP	1.40
High Temperature Coatings	HTC	1.85
Hobby/Model/Craft Coatings, Enamel	HME	1.45
Hobby/Model/Craft Coatings, Lacquer	HML	2.70
Hobby/Model/Craft Coatings, Clear or Metallic	HMC	1.60
Marine Spar Varnishes	MSV	0.90
Photograph Coatings	PHC	1.00
Pleasure Craft Primers, Surfacers or Undercoaters	PCS	1.05
Pleasure Craft Topcoats	PCT	0.60
Polyolefin Adhesion Promoters	PAP	2.50
Shellac Sealers, Clear	SSC	1.00
Shellac Sealers, Pigmented	SSP	0.95
Slip-Resistant Coatings	SRC	2.45
Spatter/Multicolor Coatings	SMC	1.05
Vinyl/Fabric/Leather/Polycarbonate Coatings	VFL	1.55
Webbing/Veiling Coatings	WFC	0.85
Weld-Through Primers	WTP	1.00
Wood Stains	WSP	1.40
Wood Touch-up/Repair or Restoration Coatings	WTR	1.50

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS

Organic compound	Reactivity factor
Carbon Monoxide	0.06
Methane	0.01
Ethane	0.31
Propane	0.56
n-Butane	1.33
n-Pentane	1.54
n-Hexane	1.45
n-Heptane	1.28
n-Octane	1.11
n-Nonane	0.95
n-Decane	0.83
n-Undecane	0.74

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
n-Dodecane	0.66
n-Tridecane	0.62
n-Tetradecane	0.58
n-Pentadecane	0.56
n-C16	0.52
n-C17	0.49
n-C18	0.47
n-C19	0.44
n-C20	0.42
n-C21	0.40
n-C22	0.38
Isobutane	1.35
Isopentane	1.68
Neopentane	0.69
Branched C5 Alkanes	1.68
2,2-Dimethyl Butane	1.33
2,3-Dimethyl Butane	1.14
2-Methyl Pentane (Isohexane)	1.80
3-Methyl Pentane	2.07
Branched C6 Alkanes	1.53
2,2,3-Trimethyl Butane	1.32
2,2-Dimethyl Pentane	1.22
2,3-Dimethyl Pentane	1.55
2,4-Dimethyl Pentane	1.65
2-Methyl Hexane	1.37
3,3-Dimethyl Pentane	1.32
3-Methyl Hexane	1.86
Branched C7 Alkanes	1.63
2,2,3,3-Tetramethyl Butane	0.44
2,2,4-Trimethyl Pentane (Isooctane)	1.44
2,2-Dimethyl Hexane	1.13
2,3,4-Trimethyl Pentane	1.23
2,3-Dimethyl Hexane	1.34
2,4-Dimethyl Hexane	1.80
2,5-Dimethyl Hexane	1.68
2-Methyl Heptane	1.20
3-Methyl Heptane	1.35
4-Methyl Heptane	1.48
Branched C8 Alkanes	1.57
2,2,5-Trimethyl Hexane	1.33
2,3,5-Trimethyl Hexane	1.33
2,4-Dimethyl Heptane	1.48
2-Methyl Octane	0.96
3,3-Diethyl Pentane	1.35
3,5-Dimethyl Heptane	1.63
4-Ethyl Heptane	1.44
4-Methyl Octane	1.08
Branched C9 Alkanes	1.25
2,4-Dimethyl Octane	1.09
2,6-Dimethyl Octane	1.27
2-Methyl Nonane	0.86
3,4-Diethyl Hexane	1.20
3-Methyl Nonane	0.89
4-Methyl Nonane	0.99
4-Propyl Heptane	1.24
Branched C10 Alkanes	1.09
2,6-Dimethyl Nonane	0.95
3,5-Diethyl Heptane	1.21
3-Methyl Decane	0.77
4-Methyl Decane	0.80
Branched C11 Alkanes	0.87
2,3,4,6-Tetramethyl Heptane	1.26
2,6-Diethyl Octane	1.09
3,6-Dimethyl Decane	0.88
3-Methyl Undecane	0.70
5-Methyl Undecane	0.72
Branched C12 Alkanes	0.80
2,3,5,7-Tetramethyl Octane	1.06
3,6-Dimethyl Undecane	0.82
3,7-Diethyl Nonane	1.08
3-Methyl Dodecane	0.64

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
5-Methyl Dodecane	0.64
Branched C13 Alkanes	0.73
2,4,6,8-Tetramethyl Nonane	0.94
2,3,6-Trimethyl 4-Isopropyl Heptane	1.24
3,7-Dimethyl Dodecane	0.74
3,8-Diethyl Decane	0.68
3-Methyl Tridecane	0.57
6-Methyl Tridecane	0.62
Branched C14 Alkanes	0.67
2,4,5,6,8-Pentamethyl Nonane	1.11
2-Methyl 3,5-Diisopropyl Heptane	0.78
3,7-Dimethyl Tridecane	0.64
3,9-Diethyl Undecane	0.62
3-Methyl Tetradecane	0.53
6-Methyl Tetradecane	0.57
Branched C15 Alkanes	0.60
2,6,8-Trimethyl 4-Isopropyl Nonane	0.76
3-Methyl Pentadecane	0.50
4,8-Dimethyl Tetradecane	0.58
7-Methyl Pentadecane	0.51
Branched C16 Alkanes	0.54
2,7-Dimethyl 3,5-Diisopropyl Heptane	0.69
Branched C17 Alkanes	0.51
Branched C18 Alkanes	0.48
Cyclopropane	0.10
Cyclobutane	1.05
Cyclopentane	2.69
Cyclohexane	1.46
Isopropyl Cyclopropane	1.52
Methylcyclopentane	2.42
C6 Cycloalkanes	1.46
1,3-Dimethyl Cyclopentane	2.15
Cycloheptane	2.26
Ethyl Cyclopentane	2.27
Methylcyclohexane	1.99
C7 Cycloalkanes	1.99
C8 Bicycloalkanes	1.75
1,3-Dimethyl Cyclohexane	1.72
Cyclooctane	1.73
Ethylcyclohexane	1.75
Propyl Cyclopentane	1.91
C8 Cycloalkanes	1.75
C9 Bicycloalkanes	1.57
1,1,3-Trimethyl Cyclohexane	1.37
1-Ethyl-4-Methyl Cyclohexane	1.62
Propyl Cyclohexane	1.47
C9 Cycloalkanes	1.55
C10 Bicycloalkanes	1.29
1,3-Diethyl Cyclohexane	1.34
1,4-Diethyl Cyclohexane	1.49
1-Methyl-3-Isopropyl Cyclohexane	1.26
Butyl Cyclohexane	1.07
C10 Cycloalkanes	1.27
C11 Bicycloalkanes	1.01
1,3-Diethyl-5-Methyl Cyclohexane	1.11
1-Ethyl-2-Propyl Cyclohexane	0.95
Pentyl Cyclohexane	0.91
C11 Cycloalkanes	0.99
C12 Bicycloalkanes	0.88
C12 Cycloalkanes	0.87
1,3,5-Triethyl Cyclohexane	1.06
1-Methyl-4-Pentyl Cyclohexane	0.81
Hexyl Cyclohexane	0.75
C13 Bicycloalkanes	0.79
1,3-Diethyl-5-Propyl Cyclohexane	0.96
1-Methyl-2-Hexyl Cyclohexane	0.70
Heptyl Cyclohexane	0.66
C13 Cycloalkanes	0.78
C14 Bicycloalkanes	0.71
1,3-Dipropyl-5-Ethyl Cyclohexane	0.94
1-Methyl-4-Heptyl Cyclohexane	0.58

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
Octyl Cyclohexane	0.60
C14 Cycloalkanes	0.71
C15 Bicycloalkanes	0.69
1,3,5-Tripropyl Cyclohexane	0.90
1-Methyl-2-Octyl Cyclohexane	0.60
Nonyl Cyclohexane	0.54
C15 Cycloalkanes	0.68
1,3-Dipropyl-5-Butyl Cyclohexane	0.77
1-Methyl-4-Nonyl Cyclohexane	0.55
Decyl Cyclohexane	0.50
C16 Cycloalkanes	0.61
Ethene	9.08
Propene (Propylene)	11.58
1-Butene	10.29
C4 Terminal Alkenes	10.29
1-Pentene	7.79
3-Methyl-1-Butene	6.99
C5 Terminal Alkenes	7.79
1-Hexene	6.17
3,3-Dimethyl-1-Butene	6.06
3-Methyl-1-Pentene	6.22
4-Methyl-1-Pentene	6.26
C6 Terminal Alkenes	6.17
1-Heptene	4.56
1-Octene	3.45
C8 Terminal Alkenes	3.45
1-Nonene	2.76
C9 Terminal Alkenes	2.76
1-Decene	2.28
C10 Terminal Alkenes	2.28
1-Undecene	1.95
C11 Terminal Alkenes	1.95
C12 Terminal Alkenes	1.72
1-Dodecene	1.72
1-Tridecene	1.55
C13 Terminal Alkenes	1.55
1-Tetradecene	1.41
C14 Terminal Alkenes	1.41
1-Pentadecene	1.37
C15 Terminal Alkenes	1.37
2-Methyl Pentene (Isobutene)	6.35
2-Methyl-1-Butene	6.51
2,3-Dimethyl-1-Butene	4.77
2-Ethyl-1-Butene	5.04
2-Methyl-1-Pentene	5.18
2,3,3-Trimethyl-1-Butene	4.62
C7 Terminal Alkenes	4.56
3-Methyl-2-Isopropyl-1-Butene	3.29
cis-2-Butene	13.22
trans-2-Butene	13.91
C4 Internal Alkenes	13.57
2-Methyl-2-Butene	14.45
cis-2-Pentene	10.24
trans-2-Pentene	10.23
2-Pentenenes	10.23
C5 Internal Alkenes	10.23
2,3-Dimethyl-2-Butene	13.32
2-Methyl-2-Pentene	12.28
cis-2-Hexene	8.44
cis-3-Hexene	8.22
cis-3-Methyl-2-Pentene	12.84
cis-3-Methyl-2-Hexene	13.38
trans 3-Methyl-2-Hexene	14.17
trans 4-Methyl-2-Hexene	7.88
trans-2-Hexene	8.44
trans-3-Hexene	8.16
2-Hexenes	8.44
C6 Internal Alkenes	8.44
2,3-Dimethyl-2-Hexene	10.41
cis-3-Heptene	6.96
trans-4,4-Dimethyl-2-Pentene	6.99

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
trans-2-Heptene	7.33
trans-3-Heptene	6.96
2-Heptenes	6.96
C7 Internal Alkenes	6.96
cis-4-Octene	5.94
trans-2,2-Dimethyl-3-Hexene	5.97
trans-2,5-Dimethyl-3-Hexene	5.44
trans-3-Octene	6.13
trans-4-Octene	5.90
3-Octenes	6.13
C8 Internal Alkenes	5.90
2,4,4-Trimethyl-2-Pentene	5.85
3-Nonenes	5.31
C9 Internal Alkenes	5.31
trans-4-Nonene	5.23
3,4-Diethyl-2-Hexene	3.95
cis-5-Decene	4.89
trans-4-Decene	4.50
C10 3-Alkenes	4.50
C10 Internal Alkenes	4.50
trans-5-Undecene	4.23
C11 3-Alkenes	4.23
C11 Internal Alkenes	4.23
C12 2-Alkenes	3.75
C12 3-Alkenes	3.75
C12 Internal Alkenes	3.75
trans-5-Dodecene	3.74
trans-5-Tridecene	3.38
C13 3-Alkenes	3.38
C13 Internal Alkenes	3.38
trans-5-Tetradecene	3.08
C14 3-Alkenes	3.08
C14 Internal Alkenes	3.08
trans-5-Pentadecene	2.82
C15 3-Alkenes	2.82
C15 Internal Alkenes	2.82
C4 Alkenes	11.93
C5 Alkenes	9.01
C6 Alkenes	6.88
C7 Alkenes	5.76
C8 Alkenes	4.68
C9 Alkenes	4.03
C10 Alkenes	3.39
C11 Alkenes	3.09
C12 Alkenes	2.73
C13 Alkenes	2.46
C14 Alkenes	2.28
C15 Alkenes	2.06
Cyclopentene	7.38
1-Methyl Cyclopentene	13.95
Cyclohexene	5.45
1-Methyl Cyclohexene	7.81
4-Methyl Cyclohexene	4.48
1,2-Dimethyl Cyclohexene	6.77
1,3-Butadiene	13.58
Isoprene	10.69
C6 Cyclic or Di-olefins	8.65
C7 Cyclic or Di-olefins	7.49
C8 Cyclic or Di-olefins	6.01
C9 Cyclic or Di-olefins	5.40
C10 Cyclic or Di-olefins	4.56
C11 Cyclic or Di-olefins	4.29
C12 Cyclic or Di-olefins	3.79
C13 Cyclic or Di-olefins	3.42
C14 Cyclic or Di-olefins	3.11
C15 Cyclic or Di-olefins	2.85
Cyclopentadiene	7.61
3-Carene	3.21
a-Pinene (Pine Oil)	4.29
b-Pinene	3.28
d-Limonene (Dipentene or Orange Terpene)	3.99

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
Sabinene	3.67
Terpene	3.79
Styrene	1.95
a-Methyl Styrene	1.72
C9 Styrenes	1.72
C10 Styrenes	1.53
Benzene	0.81
Toluene	3.97
Ethyl Benzene	2.79
Cumene (Isopropyl Benzene)	2.32
n-Propyl Benzene	2.20
C9 Monosubstituted Benzenes	2.20
s-Butyl Benzene	1.97
C10 Monosubstituted Benzenes	1.97
n-Butyl Benzene	1.97
C11 Monosubstituted Benzenes	1.78
C12 Monosubstituted Benzenes	1.63
C13 Monosubstituted Benzenes	1.50
m-Xylene	10.61
o-Xylene	7.49
p-Xylene	4.25
C8 Disubstituted Benzenes	7.48
m-Ethyl Toluene	9.37
p-Ethyl Toluene	3.75
o-Ethyl Toluene	6.61
C9 Disubstituted Benzenes	6.61
o-Diethyl Benzene	5.92
m-Diethyl Benzene	8.39
p-Diethyl Benzene	3.36
C10 Disubstituted Benzenes	5.92
C11 Disubstituted Benzenes	5.35
C12 Disubstituted Benzenes	4.90
C13 Disubstituted Benzenes	4.50
Isomers of Ethylbenzene	5.16
1,2,3-Trimethyl Benzene	11.26
1,2,4-Trimethyl Benzene	7.18
1,3,5-Trimethyl Benzene	11.22
C9 Trisubstituted Benzenes	9.90
Isomers of Propylbenzene	6.12
1,2,3,5-Tetramethyl Benzene	8.25
C10 Tetrasubstituted Benzenes	8.86
C10 Trisubstituted Benzenes	8.86
Isomers of Butylbenzene	5.48
C11 Pentasubstituted Benzenes	8.03
C11 Tetrasubstituted Benzenes	8.03
C11 Trisubstituted Benzenes	8.03
Isomers of Pentylbenzene	4.96
C12 Pentasubstituted Benzenes	7.33
C12 Hexasubstituted Benzenes	7.33
C12 Tetrasubstituted Benzenes	7.33
C12 Trisubstituted Benzenes	7.33
Isomers of Hexylbenzene	4.53
C13 Trisubstituted Benzenes	6.75
Indene	3.21
Indane	3.17
Naphthalene	3.26
Tetralin	2.83
Methyl Indans	2.83
Methyl Naphthalenes	4.61
1-Methyl Naphthalene	4.61
2-Methyl Naphthalene	4.61
C11 Tetralin or Indane	2.56
2,3-Dimethyl Naphthalene	5.54
C12 Disubstituted Naphthalenes	5.54
Dimethyl Naphthalenes	5.54
C12 Monosubstituted Naphthalenes	4.20
C12 Tetralin or Indane	2.33
C13 Disubstituted Naphthalenes	5.08
C13 Trisubstituted Naphthalenes	5.08
C13 Monosubstituted Naphthalenes	3.86
Acetylene	1.25

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
Methyl Acetylene	6.45
2-Butyne	16.33
Ethyl Acetylene	6.20
Methanol	0.71
Ethanol	1.69
Isopropanol (2-Propanol or Isopropyl Alcohol)	0.71
n-Propanol (n-Propyl Alcohol)	2.74
Isobutanol (Isobutyl Alcohol)	2.24
1-Butanol (n-Butyl Alcohol)	3.34
2-Butanol (s-Butyl Alcohol)	1.60
t-Butyl Alcohol	0.45
Cyclopentanol	1.96
2-Pentanol	1.74
3-Pentanol	1.73
n-Pentanol (Amyl Alcohol)	3.35
Isoamyl Alcohol (3-Methyl-1-Butanol)	2.73
2-Methyl-1-Butanol	2.60
Cyclohexanol	2.25
1-Hexanol	2.74
2-Hexanol	2.46
4-Methyl-2-Pentanol (Methyl Isobutyl Carbinol)	2.89
1-Heptanol	2.21
Dimethylpentanol (2,3-Dimethyl-1-Pentanol)	2.51
1-Octanol	2.01
2-Ethyl-1-Hexanol (Ethyl Hexyl Alcohol)	2.20
2-Octanol	2.16
3-Octanol	2.57
4-Octanol	3.07
5-Methyl-1-Heptanol	1.95
Trimethylcyclohexanol	2.17
Dimethylheptanol (2,6-Dimethyl-2-Heptanol)	1.07
2,6-Dimethyl-4-Heptanol	2.37
Menthol	1.70
Isodecyl Alcohol (8-Methyl-1-Nonanol)	1.23
1-Decanol	1.22
3,7-Dimethyl-1-Octanol	1.42
Trimethylnonanolthreoerythro; 2,6,8-Trimethyl-4Nonanol	1.55
Ethylene Glycol	3.36
Propylene Glycol	2.75
1,2-Butanediol	2.21
Glycerol (1,2,3-Propanetriol)	3.27
1,4-Butanediol	3.22
Pentaerythritol	2.42
1,2-Dihydroxy Hexane	2.75
2-Methyl-2,4-Pentanediol	1.04
2-Ethyl-1,3-Hexanediol	2.62
Dimethyl Ether	0.93
Trimethylene Oxide	5.22
1,3-Dioxolane	5.47
Dimethoxymethane	1.04
Tetrahydrofuran	4.95
Diethyl Ether	4.01
1,4-Dioxane	2.71
Alpha-Methyltetrahydrofuran	4.62
Tetrahydropyran	3.81
Ethyl Isopropyl Ether	3.86
Methyl n-Butyl Ether	3.66
Methyl t-Butyl Ether	0.78
2,2-Dimethoxypropane	0.52
Di n-Propyl Ether	3.24
Ethyl n-Butyl Ether	3.86
Ethyl t-Butyl Ether	2.11
Methyl t-Amyl Ether	2.14
Di-isopropyl Ether	3.56
Ethylene Glycol Diethyl Ether; 1,2Diethoxyethane	2.84
Acetal (1,1-Diethoxyethane)	3.68
4,4-Dimethyl-3-Oxahexane	2.03
2-Butyl Tetrahydrofuran	2.53
Di-Isobutyl Ether	1.29
Di-n-butyl Ether	3.17
2-Methoxy-1-(2-Methoxy-1-Methylethoxy)Propane	2.09

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
Di-n-Pentyl Ether	2.64
Ethylene Glycol Monomethyl Ether (2Methoxyethanol)	2.98
Propylene Glycol Monomethyl Ether (1-Methoxy-2-Propanol)	2.62
2-Ethoxyethanol	3.78
2-Methoxy-1-Propanol	3.01
3-Methoxy-1-Propanol	4.01
Diethylene Glycol	3.55
Tetrahydro-2-Furanmethanol	3.54
Propylene Glycol Monoethyl Ether (1-Ethoxy-2-Propanol)	3.25
Ethylene Glycol Monopropyl Ether (2Propoxyethanol)	3.52
3-Ethoxy-1-Propanol	4.24
3-Methoxy-1-Butanol	0.97
Diethylene Glycol Methyl Ether [2-(2Methoxyethoxy) Ethanol]	2.90
Propylene Glycol Monopropyl Ether (1-Propoxy-2-Propanol)	2.86
Ethylene Glycol Monobutyl Ether [2Butoxyethanol]	2.90
3-Methoxy-3-Methyl-Butanol	1.74
n-Propoxypropanol	3.84
2-(2-Ethoxyethoxy) Ethanol	3.19
Dipropylene Glycol	2.48
Triethylene Glycol	3.41
Propylene Glycol t-Butyl Ether (1-tert-Butoxy-2-Propanol)	1.71
2-tert-Butoxy-1-Propanol	1.81
n-Butoxy-2-Propanol	2.70
Dipropylene Glycol Methyl Ether Isomer (1Methoxy-2-[2-Hydroxypropoxy]-Propane)	2.21
Dipropylene Glycol Methyl Ether Isomer (2-[2Methoxypropoxy]-1-Propanol)	3.02
2-Hexyloxyethanol	2.45
2-(2-Propoxyethoxy) Ethanol	3.00
2,2,4-Trimethyl-1,3-Pentanediol	1.74
2-(2-Butoxyethoxy)-Ethanol	2.70
2-[2-(2-Methoxyethoxy) Ethoxy] Ethanol	2.62
Dipropylene Glycol Ethyl Ether	2.75
Ethylene Glycol 2-Ethylhexyl Ether [2-(2Ethylhexyloxy) Ethanol]	1.71
2-[2-(2-Ethoxyethoxy) Ethoxy] Ethanol	2.66
Tetraethylene Glycol	2.84
1-(Butoxyethoxy)-2-Propanol	2.08
2-(2-Hexyloxyethoxy) Ethanol	2.03
Glycol Ether dpnb (1-(2-Butoxy-1-Methylethoxy)2-Propanol)	1.96
2-[2-(2-Propoxyethoxy) Ethoxy] Ethanol	2.46
2-[2-(2-Butoxyethoxy) Ethoxy] Ethanol	2.24
Tripropylene Glycol Monomethyl Ether	1.90
2,5,8,11-Tetraoxatridecan-13-ol	2.15
3,6,9,12-Tetraoxahexadecan-1-ol	1.90
Cumene Hydroperoxide (1-Methyl-1Phenylethylhydroperoxide)	12.61
Methyl Formate	0.06
Ethyl Formate	0.52
Methyl Acetate	0.07
gamma-Butyrolactone	1.15
Ethyl Acetate	0.64
Methyl Propionate	0.71
n-Propyl Formate	0.93
Isopropyl Formate	0.42
Ethyl Propionate	0.79
Isopropyl Acetate	1.12
Methyl Butyrate	1.18
Methyl Isobutyrate	0.70
n-Butyl Formate	0.95
Propyl Acetate	0.87
Ethyl Butyrate	1.25
Isobutyl Acetate	0.67
Methyl Pivalate (2,2-Dimethyl Propanoic Acid Methyl Ester)	0.39
n-Butyl Acetate	0.89
n-Propyl Propionate	0.93
s-Butyl Acetate	1.43
t-Butyl Acetate	0.20
Butyl Propionate	0.89
Amyl Acetate	0.96
n-Propyl Butyrate	1.17
Isoamyl Acetate (3-Methylbutyl Acetate)	1.18
2-Methyl-1-Butyl Acetate	1.17
EEP Solvent (Ethyl 3-Ethoxy Propionate)	3.61
2,3-Dimethylbutyl Acetate	0.84

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
2-Methylpentyl Acetate	1.11
3-Methylpentyl Acetate	1.31
4-Methylpentyl Acetate	0.92
Isobutyl Isobutyrate	0.61
n-Butyl Butyrate	1.12
n-Hexyl Acetate (Hexyl Acetate)	0.87
Methyl Amyl Acetate (4-Methyl-2-Pentanol Acetate)	1.46
n-Pentyl Propionate	0.79
2,4-Dimethylpentyl Acetate	0.98
2-Methylhexyl Acetate	0.89
3-Ethylpentyl Acetate	1.24
3-Methylhexyl Acetate	1.01
4-Methylhexyl Acetate	0.91
5-Methylhexyl Acetate	0.79
Isoamyl Isobutyrate	0.89
n-Heptyl Acetate (Heptyl Acetate)	0.73
2,4-Dimethylhexyl Acetate	0.93
2-Ethyl-Hexyl Acetate	0.79
3,4-Dimethylhexyl Acetate	1.16
3,5-Dimethylhexyl Acetate	1.09
3-Ethylhexyl Acetate	1.03
3-Methylheptyl Acetate	0.76
4,5-Dimethylhexyl Acetate	0.86
4-Methylheptyl Acetate	0.72
5-Methylheptyl Acetate	0.73
n-Octyl Acetate	0.64
2,3,5-Trimethylhexyl Acetate	0.86
2,3-Dimethylheptyl Acetate	0.84
2,4-Dimethylheptyl Acetate	0.88
2,5-Dimethylheptyl Acetate	0.86
2-Methyloctyl Acetate	0.63
3,5-Dimethylheptyl Acetate	1.01
3,6-Dimethylheptyl Acetate	0.87
3-Ethylheptyl Acetate	0.71
4,5-Dimethylheptyl Acetate	0.96
4,6-Dimethylheptyl Acetate	0.83
4-Methyloctyl Acetate	0.68
5-Methyloctyl Acetate	0.67
n-Nonyl Acetate	0.58
3,6-Dimethyloctyl Acetate	0.88
3-Isopropylheptyl Acetate	0.71
4,6-Dimethyloctyl Acetate	0.85
3,5,7-Trimethyloctyl Acetate	0.83
3-Ethyl-6-Methyloctyl Acetate	0.80
4,7-Dimethylnonyl Acetate	0.64
Methyl Dodecanoate (Methyl Laurate)	0.53
2,3,5,7-Tetramethyloctyl Acetate	0.74
3,5,7-Trimethylnonyl Acetate	0.76
3,6,8-Trimethylnonyl Acetate	0.72
2,4,6,8-Tetramethylnonyl Acetate	0.63
3-Ethyl-6,7-Dimethylnonyl Acetate	0.76
4,7,9-Trimethyldecyl Acetate	0.55
Methyl Myristate (Methyl Tetradecanoate)	0.47
2,3,5,6,8-Pentaamethylnonyl Acetate	0.74
3,5,7,9-Tetramethyldecyl Acetate	0.58
5-Ethyl-3,6,8-Trimethylnonyl Acetate	0.77
Dimethyl Carbonate	0.06
Propylene Carbonate (4-Methyl-1,3-Dioxolan-2-one)	0.25
Methyl Lactate	2.75
2-Methoxyethyl Acetate	1.18
Ethyl Lactate	2.71
Methyl Isopropyl Carbonate	0.69
Propylene Glycol Monomethyl Ether Acetate (1Methoxy-2-Propyl Acetate)	1.71
2-Ethoxyethyl Acetate	1.90
2-Methoxy-1-Propyl Acetate	1.12
Methoxypropanol Acetate	1.97
Dimethyl Succinate	0.23
Ethylene Glycol Diacetate	0.72
1,2-Propylene Glycol Diacetate	0.94
Diisopropyl Carbonate	1.04
Dimethyl Glutarate	0.51

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
Ethylene Glycol Monobutyl Ether Acetate (2Butoxyethyl Acetate)	1.67
Dimethyl Adipate	1.95
2-(2-Ethoxyethoxy) Ethyl Acetate	1.50
Dipropylene Glycol n-Propyl Ether Isomer #1	2.13
Dipropylene Glycol Methyl Ether Acetate Isomer #1	1.41
Dipropylene Glycol Methyl Ether Acetate Isomer #2	1.58
Dipropylene Glycol Methyl Ether Acetate	1.49
Glyceryl Triacetate	0.57
2-(2-Butoxyethoxy) Ethyl Acetate	1.38
Substituted C7 Ester (C12)	0.92
1-Hydroxy-2,2,4-Trimethylpentyl-3-Isobutyrate	0.92
3-Hydroxy-2,2,4-Trimethylpentyl-1-Isobutyrate	0.88
Hydroxy-2,2,4-Trimethylpentyl Isobutyrate Isomers (2,2,4-Trimethyl-1,3-Pentanediol Monoisobutyrate)	0.89
Substituted C9 Ester (C12)	0.89
Dimethyl Sebacate	0.48
Diisopropyl Adipate	1.42
Ethylene Oxide	0.05
Propylene Oxide	0.32
1,2-Epoxybutane (Ethyl Oxirane)	1.02
Formic Acid	0.08
Acetic Acid	0.71
Glycolic Acid (Hydroxyacetic Acid)	2.67
Peracetic Acid (Peroxyacetic Acid)	12.62
Acrylic Acid	11.66
Propionic Acid	1.16
Methacrylic Acid	18.78
Isobutyric Acid	1.22
Butanoic Acid	1.78
Malic Acid	7.51
3-Methylbutanoic Acid	4.26
Adipic Acid	3.37
2-Ethyl Hexanoic Acid	4.41
Methyl Acrylate	12.24
Vinyl Acetate	3.26
2-Methyl-2-Butene-3-ol (1,2-Dimethylpropyl-1en-1-ol)	5.12
Ethyl Acrylate	8.78
Methyl Methacrylate	15.84
Hydroxypropyl Acrylate	5.56
n-Butyl Acrylate	5.52
Isobutyl Acrylate	5.05
Butyl Methacrylate	9.09
Isobutyl Methacrylate	8.99
Isobornyl Methacrylate	8.64
a-Terpineol	5.16
2-Ethyl-Hexyl Acrylate	2.42
Furan	16.54
Formaldehyde	8.97
Acetaldehyde	6.84
Propionaldehyde	7.89
2-Methylpropanal	5.87
Butanal	6.74
C4 Aldehydes	6.74
2,2-Dimethylpropanal (Pivaldehyde)	5.40
3-Methylbutanal (Isovaleraldehyde)	5.52
Pentanal (Valeraldehyde)	5.76
C5 Aldehydes	5.76
Glutaraldehyde	4.79
Hexanal	4.98
C6 Aldehydes	4.98
Heptanal	4.23
C7 Aldehydes	4.23
2-Methyl-Hexanal	3.97
Octanal	3.65
C8 Aldehydes	3.65
Glyoxal	14.22
Methyl Glyoxal	16.21
Acrolein	7.60
Crotonaldehyde	10.07
Methacrolein	6.23
Hydroxy Methacrolein	6.61
Benzaldehyde	0.00

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
Tolualdehyde	0.00
Acetone	0.43
Cyclobutanone	0.68
Methyl Ethyl Ketone (2-Butanone)	1.49
Cyclopentanone	1.43
C5 Cyclic Ketones	1.43
Methyl Propyl Ketone (2-Pentanone)	3.07
3-Pentanone	1.45
C5 Ketones	3.07
Methyl Isopropyl Ketone	1.64
2,4-Pentanedione	1.02
Cyclohexanone	1.61
C6 Cyclic Ketones	1.61
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	4.31
Methyl n-Butyl Ketone (2-Hexanone)	3.55
Methyl t-Butyl Ketone	0.78
C6 Ketones	3.55
C7 Cyclic Ketones	1.41
Methyl Amyl Ketone (2-Heptanone)	2.80
2-Methyl-3-Hexanone	1.79
Di-Isopropyl Ketone	1.63
C7 Ketones	2.80
3-Methyl-2-Hexanone	2.81
Methyl Isoamyl Ketone (5-Methyl-2-Hexanone)	2.10
C8 Cyclic Ketones	1.25
2-Octanone	1.66
C8 Ketones	1.66
C9 Cyclic Ketones	1.13
2-Propyl Cyclohexanone	1.71
4-Propyl Cyclohexanone	2.08
2-Nonanone	1.30
Di-Isobutyl Ketone (2,6-Dimethyl-4-Heptanone)	2.94
C9 Ketones	1.30
C10 Cyclic Ketones	1.02
2-Decanone	1.06
C10 Ketones	1.06
2,6,8-Trimethyl-4-Nonanone; Isobutyl Heptyl Ketone	1.86
Biacetyl	20.73
Methylvinyl ketone	8.73
Mesityl Oxide (2-Methyl-2-Penten-4-one)	17.37
Isophorone (3,5,5-Trimethyl-2-Cyclohexenone)	10.58
1-Nonene-4-one	3.39
Hydroxy Acetone	3.08
Dihydroxyacetone	4.02
Methoxy Acetone	2.14
Diacetone Alcohol (4-Hydroxy-4-Methyl-2-Pentanone)	0.68
Phenol	1.82
C7 Alkyl Phenols	2.34
m-Cresol	2.34
p-Cresol	2.34
o-Cresol	2.34
C8 Alkyl Phenols	2.07
C9 Alkyl Phenols	1.86
C10 Alkyl Phenols	1.68
C11 Alkyl Phenols	1.54
C12 Alkyl Phenols	1.42
2-Phenoxyethanol; Ethylene Glycol Phenyl Ether	3.61
1-Phenoxy-2-Propanol	1.73
Nitrobenzene	0.07
Para Toluene Isocyanate	0.93
Toluene Diisocyanate (Mixed Isomers)	0.00
Methylene Diphenylene Diisocyanate	0.79
N-Methyl Acetamide	19.70
Dimethyl Amine	9.37
Ethyl Amine	7.80
Trimethyl Amine	7.06
Triethyl Amine	16.60
Diethylenetriamine	13.03
Ethanolamine	5.97
Dimethylaminoethanol	4.76
Monoisopropanol Amine (1-Amino-2-Propanol)	13.42

TABLE 2A TO SUBPART E OF PART 59.—REACTIVITY FACTORS—Continued

Organic compound	Reactivity factor
2-Amino-2-Methyl-1-Propanol	15.08
Diethanol Amine	4.05
Triethanolamine	2.76
Methyl Pyrrolidone (N-Methyl-2-Pyrrolidone)	2.56
Morpholine	15.43
Nitroethane	12.79
Nitromethane	7.86
1-Nitropropane	16.16
2-Nitropropane	16.16
Dexpanthenol (Pantothenylol)	9.35
Methyl Ethyl Ketoxime (Ethyl Methyl Ketone Oxime)	22.04
Hydroxyethylethylene Urea	14.75
Methyl Chloride	0.03
Methylene Chloride (Dichloromethane)	0.07
Methyl Bromide	0.02
Chloroform	0.03
Carbon Tetrachloride	0.00
Methylene Bromide	0.00
Vinyl Chloride	2.92
Ethyl Chloride	0.25
1,1-Dichloroethane	0.10
1,2-Dichloroethane	0.10
Ethyl Bromide	0.11
1,1,1-Trichloroethane	0.00
1,1,2-Trichloroethane	0.06
1,2-Dibromoethane	0.05
n-Propyl Bromide	0.35
n-Butyl Bromide	0.60
trans-1,2-Dichloroethene	0.81
Trichloroethylene	0.60
Perchloroethylene	0.04
2-(Chloro-Methyl)-3-Chloro Propene	1.13
Monochlorobenzene	0.36
p-Dichlorobenzene	0.20
Benzotrifluoride	0.26
PCBTF (p-Trifluoromethyl-CI-Benzene)	0.11
HFC-134a (1,1,1,2-Tetrafluoroethane)	0.00
HFC-152a (1,1-Difluoroethane)	0.00
Dimethyl Sulfoxide	6.90
Unspeciated C6 Alkanes	1.48
Unspeciated C7 Alkanes	1.79
Unspeciated C8 Alkanes	1.64
Unspeciated C9 Alkanes	2.13
Unspeciated C10 Alkanes	1.16
Unspeciated C11 Alkanes	0.90
Unspeciated C12 Alkanes	0.81
Unspeciated C13 Alkanes	0.73
Unspeciated C14 Alkanes	0.67
Unspeciated C15 Alkanes	0.61
Unspeciated C16 Alkanes	0.55
Unspeciated C17 Alkanes	0.52
Unspeciated C18 Alkanes	0.49
Unspeciated C10 Aromatics	5.48
Unspeciated C11 Aromatics	4.96
Unspeciated C12 Aromatics	4.53
Base ROG Mixture	3.71
Alkane, Mixed—Predominantly (Minimally 94%) C13–14	0.67
Oxo-Hexyl Acetate	1.03
Oxo-Heptyl Acetate	0.97
Oxo-Octyl Acetate	0.96
Oxo-Nonyl Acetate	0.85
Oxo-Decyl Acetate	0.83
Oxo-Dodecyl Acetate	0.72
Oxo-Tridecyl Acetate	0.67

TABLE 2B TO SUBPART E OF PART 59.—REACTIVITY FACTORS FOR ALIPHATIC HYDROCARBON SOLVENT MIXTURES

Bin	Average Boiling Point* (degrees F)	Criteria	Reactivity factor
1	80–205	Alkanes (<2% Aromatics)	2.08
2	80–205	N- & Iso-Alkanes (≥90% and <2% Aromatics)	1.59
3	80–205	Cyclo-Alkanes (≥90% and <2% Aromatics)	2.52
4	80–205	Alkanes (2 to <8% Aromatics)	2.24
5	80–205	Alkanes (8 to 22% Aromatics)	2.56
6	>205–340	Alkanes (<2% Aromatics)	1.41
7	>205–340	N- & Iso-Alkanes (≥90% and <2% Aromatics)	1.17
8	>205–340	Cyclo-Alkanes (≥90% and <2% Aromatics)	1.65
9	>205–340	Alkanes (2 to <8% Aromatics)	1.62
10	>205–340	Alkanes (8 to 22% Aromatics)	2.03
11	>340–460	Alkanes (<2% Aromatics)	0.91
12	>340–460	N- & Iso-Alkanes (≥90% and <2% Aromatics)	0.81
13	>340–460	Cyclo-Alkanes (≥90% and <2% Aromatics)	1.01
14	>340–460	Alkanes (2 to <8% Aromatics)	1.21
15	>340–460	Alkanes (8 to 22% Aromatics)	1.82
16	>460–580	Alkanes (<2% Aromatics)	0.57
17	>460–580	N- & Iso-Alkanes (≥90% and <2% Aromatics)	0.51
18	>460–580	Cyclo-Alkanes (>90% and <2% Aromatics)	0.63
19	>460–580	Alkanes (2 to <8% Aromatics)	0.88
20	>460–580	Alkanes (8 to 22% Aromatics)	1.49

* Average Boiling Point = (Initial Boiling Point + Dry Point)/2(b) Aromatic Hydrocarbon Solvents

TABLE 2C TO SUBPART E OF PART 63.—REACTIVITY FACTORS FOR AROMATIC HYDROCARBON SOLVENT MIXTURES

Bin	Boiling range (degrees F)	Criteria	Reactivity factor
21	280–290	Aromatic Content (≥98%)	7.37
22	320–350	Aromatic Content (≥98%)	7.51
23	355–420	Aromatic Content (≥98%)	8.07
24	450–535	Aromatic Content (≥98%)	5.00

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