A Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared by the Volatile Organic Compounds from Processes and Consumer Products Workgroup

October 31, 2005

Table of Contents

		Page
	List of Figures……..	iii
	List of Tables…….	iii
	List of Appendices…….	iv
	Acronyms and Abbreviations…….	v
	Executive Summary…….	vi
I.	Introduction……...	1
II.	Purpose and Goals……..	3
III.	Structure of Workgroup……...	4
IV.	Summary of Meetings/Conference Calls/Data Reviewed……..	4
V.	Initial Workgroup Control Measure Considerations…	5
	A. How the Workgroup Focused its Analysis on Control Measures……...	5
	B. Discussion of the Control Measure Evaluation Process…….	7
	C. Review of All Measures Evaluated by the Workgroup Based on the Criteria in Section B Above..	7
VI.	Workgroup Prioritization of Measures for Further Consideration……..	7
VII.	Detailed Review of Control Measures…….	9
VIII.	Summary of “Parking Lot” Issues…….	19
IX.	Comments…….	21
X.	References……..	22

List of Figures

Figure 1: 2002 Draft New Jersey VOC Emissions by Sector (*Page 2*)

Figure 2: 2002 Draft New Jersey VOC Emission Inventory Top 15 by SCC (*Page 2*)

Figure 3: 2002 Draft New Jersey Point Source VOC Emission Inventory Top 15 by SCC (*Page 6*)

Figure 4: 2002 Draft New Jersey Area Source VOC Emission Inventory Top 15 by SCC (*Page 6*)

List of Tables

Table 1: Expected VOC Emission Reductions from Current Rules (*Page 3*)

Table 2: Workgroup Proposal Ranking (*Page 8*)

List of Appendices

Appendix A: List of Workgroup Participants

Appendix B: Workgroup Meeting Summaries

1. June 29, 2005
2. July 12, 2005
3. August 9, 2005
4. September 7, 2005

Appendix C: Data Reviewed by the Workgroup

1. Draft 2002 New Jersey Point Source VOC Emission Inventory Top 15
2. Draft 2002 New Jersey Area Source VOC Emission Inventory Top 15
3. Draft 2002 Periodic Emissions Inventory Area Source VOC Emissions Summer and Annual Statewide
4. Sample Area Source Calculation Sheets
5. *Successfully Creating a Reactivity-Based Program for Control of VOCs in Consumer Products and Coatings*, American Solvents Council of the American Chemistry Council, July 12, 2005
6. "Vaporsaver™ 1" and "The Permeator™ documentation
7. USEPA Federal Register Advance Notice to Solicit Comments, Data and Information for Determining the Emissions Achieved in Ozone Attainment and Maintenance Areas From the Implementation of Rules Limiting the VOC Content of AIM Coatings, August 31, 2005
8. USEPA Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans

Appendix D: Proposal Tracking Forms

Appendix E: White Papers

Acronyms and Abbreviations

ACO	Administrative Consent Order	**AIMs**	Architectural and Industrial Maintenance Coatings
API	American Petroleum Institute	**CAA**	Clean Air Act
CARB	California Air Resources Board	**LDAR**	Leak Detection and Repair
MACT	Maximum Achievable Control Technology	**MARAMA**	Mid-Atlantic Regional Air Management Association
NOx	Oxides of Nitrogen	**NJDEP**	New Jersey Department of Environmental Protection
OTC	Ozone Transport Commission	**NSPS**	New Source Performance Standards
RACT	Reasonably Available Control Technology	**PFC**	Portable Fuel Container
SIP	State Implementation Plan	**SEP**	Supplemental Environmental Project
tpd	Tons Per Day	**SOTA**	State of the Art
USEPA	United States Environmental Protection Agency	**tpy**	Tons Per Year
Workgroup	Volatile Organic Compounds from Processes and Consumer Products Workgroup	**VOC**	Volatile Organic Compound

Executive Summary

This report is a summary of the findings of the Volatile Organic Compounds from Processes and Consumer Products Workgroup (Workgroup). The Workgroup was formed as a result of the *Reducing Air Pollution Together Workshop* hosted by the New Jersey Department of Environmental Protection (NJDEP) on June 29, 2005.

The Workgroup consisted of stakeholders and NJDEP staff. The stakeholders represented a wide range of industry sectors, as well as environmental groups and trade organizations. Because the Workgroup consisted of representatives with various backgrounds and interests, the members did not come to a consensus on every reduction strategy.

The Workgroup was charged with identifying viable ways to reduce air contaminant emissions from various chemical products and/or processes. This included all consumer products and industrial processes. The emission reduction strategies will be considered by the NJDEP for possible inclusion in the State Implementation Plan (SIP).

Although the NJDEP has recently adopted rules that address several of the top volatile organic compound (VOC) emitting categories, New Jersey continues to exceed health-based standards for ozone and fine-particle pollution. VOCs are a significant precursor to ozone formation. Emissions from industrial facilities, electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of VOCs. The NJDEP must meet the United States Environmental Protection Agency 8-hour ozone standard by June 2010. The State's plan to meet this new standard depends on identifying and implementing additional measures to reduce air pollution.

Overall, the Workgroup met throughout the summer as one team with a common goal: to identify strategies to reduce VOC emissions from processes and consumer products. The following control measures are considered to be the most promising by the Workgroup:

1) Additional control of Consumer Products,
2) Requiring new technology at gasoline stations which reduces vapors especially at larger vacuum assist stations, and
3) Control of refinery flares by enhanced control of currently uncontrolled predictable gas streams,
4) Further regulation of degreasers, primarily through educational and enforcement outreach,
5) Accelerate conversion to the new Portable Fuel Containers by educational outreach to the public and by considering a phase in of mandatory changeout,

Additional recommendations of controls that have been judged by the Workgroup to be promising include:

1) Control of Consumer Products and architectural and industrial maintenance coating (AIM) aerosol products through the use of reactivity based regulations.
2) Improvements in leak detection and repair by including previously unregulated sources, and using imaging technology to identify fugitive leaks and sources,
3) Investigate and control tank cleaning operations at large bulk tank terminals,
4) Further capture and control emissions from bulk tank terminals, and
5) Improve gasoline dispensing through a variety of public outreach and education efforts.

In order for participants to have an equal opportunity to share their opinions and ideas, all members of the Workgroup were encouraged to provide "white papers" on specific strategies. The white papers serve as a supplement to the Workgroup report and will assist the NJDEP in its subsequent deliberations on measures to include in the SIP.

I. Introduction

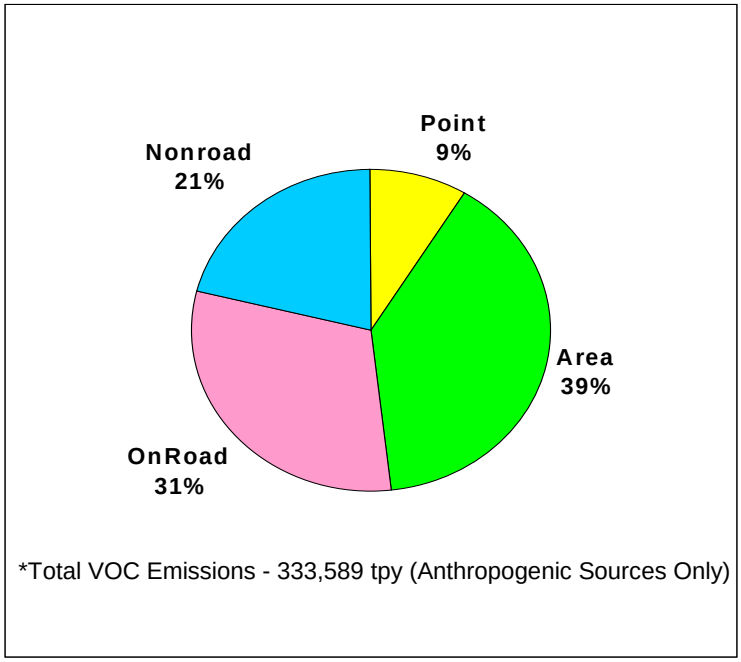
The United States Environmental Protection Agency (USEPA) has set air quality standards that New Jersey must meet. Working together with the regulated community and other interested parties can help the State of New Jersey to identify the most efficient and effective means to improve air quality.

New Jersey's air quality on the whole has improved significantly since the Federal Clean Air Act (CAA) became law 35 years ago. The Garden State meets the health-based standard for carbon monoxide and lead, and has made significant progress reducing other air pollutants. However, New Jersey continues to exceed health-based standards for ozone and fine-particle pollution. Volatile organic compounds (VOCs) are a significant precursor to ozone formation. Ozone is formed when oxides of nitrogen (NO_x) and VOCs react in the presence of sunlight. Emissions from industrial facilities, electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of VOCs. The New Jersey Department of Environmental Protection (NJDEP) must meet the USEPA 8-hour ozone standard by June 2010. The State's plan to meet this new standard depends on identifying and implementing additional measures to reduce air pollution.

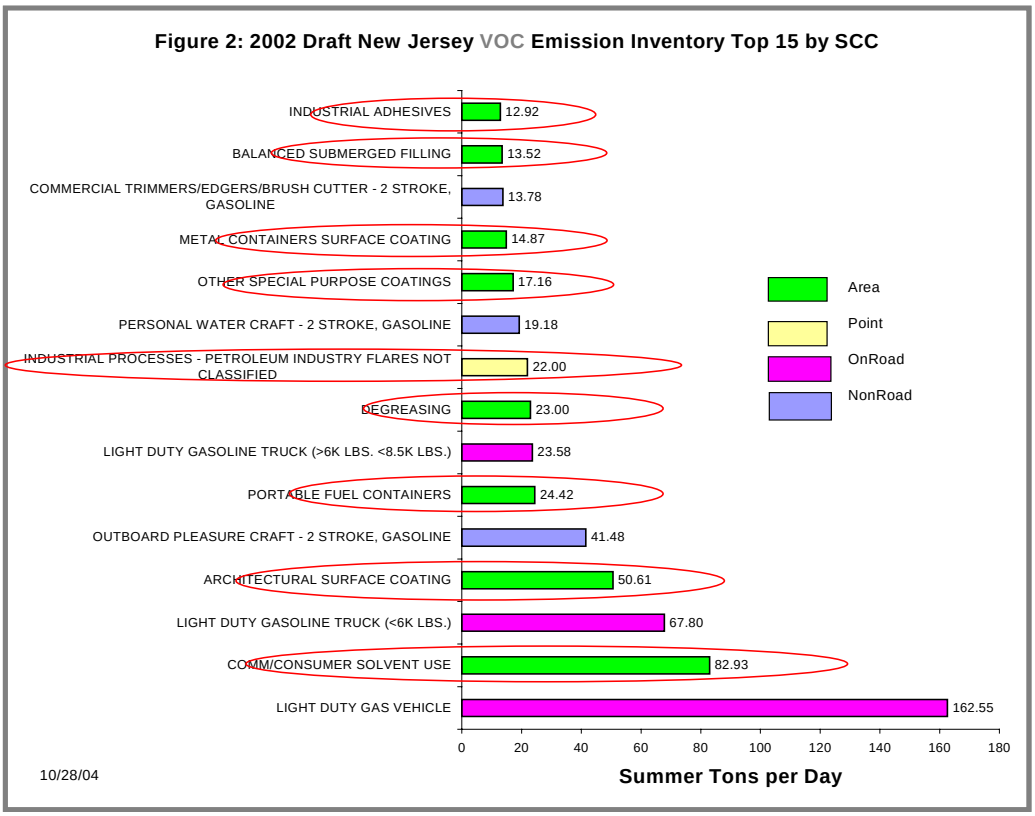
Figure 1 shows New Jersey's VOC emissions by sector based on the 2002 Draft New Jersey Emission Inventory. VOC emissions were 333,589 tons per year (tpy) in 2002. Area sources comprised 39% of annual VOC emissions while point sources comprised 9% of annual VOC emissions. Point source is defined by the USEPA as "A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g. a pipe, ditch, ship, ore pit, factory smokestack". Area source is defined by the USEPA as "Any source of air pollution that is released over a relatively small area but which cannot be classified as a point source. Such sources may include small engines, small businesses and household activities, or biogenic sources such as a forest that releases hydrocarbons." NJDEP categorizes Title V affected facilities as point sources. Non-Title V commercial and industrial operations are included as area sources in the emission inventory.

Onroad and nonroad sources comprised a total of 52% of annual VOC emissions. Onroad sources were examined by the Gasoline Cars and Trucks and Diesel Initiatives Workgroups and Nonroad Sources were examined by the Non-Automotive Gasoline Engines and Diesel Initiatives Workgroup.

Figure 1. 2002 Draft New Jersey VOC Emissions by Sector*



The top 15 VOC sources based on the Draft 2002 New Jersey VOC Emission Inventory are shown in Figure 2. Emissions are shown in summer tons per day. Source categories focused on by the Workgroup are circled in red.



The NJDEP has adopted several rules that address several of the top VOC emitting categories which are based on the model Ozone Transport Commission (OTC) rules. One rule controls the VOC content and toxics of consumer products and establishes requirements that apply to persons who are manufacturers, distributors, suppliers and retailers of consumer products. These rules apply to certain chemically formulated VOC containing consumer products (such as hair spray, insecticides, and cleaners), as well as portable fuel containers (gas cans), from which VOCs may be emitted when gasoline are poured into or out of the container or stored in the container.

On April 30, 2003, the NJDEP adopted rules based on the model OTC rules establishing new requirements for solvent cleaning operations, mobile equipment repair and refinishing operations, and gasoline transfer operations.

On May 21, 2004, the NJDEP adopted rules based on the model OTC rules that establish standards for architectural coatings (paints, varnishes, stains and traffic coatings) for manufacturers, suppliers, distributors, retailers and persons who apply architectural coatings.

The expected statewide emission reductions from these control measures and anticipated reduction dates are included in Table 1.

Table 1: Expected VOC Emission Reductions from Current Rules

Measure	Reduction	By
Consumer Products	12 tpd	2007
Portable Fuel Containers	6 tpd	2007
Solvent Cleaning Operations	4 tpd	2005
Surface Coating Operations at Mobile Equipment Repair and Refinishing Facilities	9 tpd	2005
Gasoline Transfer Operations	14 tpd	2007
Architectural Coatings	25 tpd	2005

II. Purpose and Goals

The Workgroup was charged with identifying viable ways to reduce air contaminant emissions from various chemical products and/or processes. This includes all consumer products and industrial processes. The emission reduction strategies are to be focused for possible inclusion in the State Implementation Plan (SIP).

The Workgroup was also charged with prioritizing reasonable and effective control measures, identifying implementation issues and potential solutions, and identifying additional sources of data to enhance the State's database on air pollutants.

The Workgroup consisted of stakeholders and NJDEP staff. The stakeholders represented a wide range of industry sectors, as well as environmental groups and trade organization representatives. Because the Workgroup consisted of representatives with various backgrounds and interests, the members did not come to a consensus on every reduction strategy.

In order to give participants an equal opportunity to share their opinions and ideas, all members of the Workgroup were encouraged to provide "white papers" on specific strategies. The white papers serve as a supplement to the Workgroup report and will assist the NJDEP in its subsequent deliberations on measures to include in the SIP.

The Workgroup process is an early step in the development of the SIP. There will be additional opportunities to select and refine measures for inclusion in the SIP beyond this exercise. In addition, the NJDEP expects that many Workgroup members will continue to be active in developing and commenting on both the proposed list of measures and the detailed implementation plan, including any rule proposals.

III. Structure of Workgroup

The Workgroup functioned as a single group throughout the course of this exercise. At the July 12 meeting, the members were presented with the option to form subgroups. Several Workgroup participants suggested that the next meeting consist of split sessions (i.e. consumer products for a portion of the day and industrial sources for a portion of the day). The August 9 meeting functioned in this manner. Overall, the Workgroup functioned as one team with a common goal.

IV. Summary of Meetings/Conference Calls/Data Reviewed

The Workgroup initially met on June 29 following the NJDEP Air Quality Workshop at the War Memorial in Trenton. Subsequent meetings took place on July 12, August 9, and September 7. Summaries of the Workgroup meetings are included in Appendix B.

Data reviewed by the Workgroup included the following:

1. Draft 2002 New Jersey Point Source VOC Emission Inventory Top 15
2. Draft 2002 New Jersey Area Source VOC Emission Inventory Top 15
3. Draft 2002 Periodic Emissions Inventory Area Source VOC Emissions Summer and Annual Statewide
4. Sample Area Source Calculation Sheets

5. Draft 2002 Periodic Emission Inventory Area Source Calculation Methodology Sheets, NJDEP, December 15, 2004 (available online at http://www.state.nj.us/dep/airworkgroups/docs/2002calcsheetsv2.pdf)
6. *Successfully Creating a Reactivity-Based Program for Control of VOCs in Consumer Products and Coatings*, American Solvents Council of the American Chemistry Council, July 12, 2005
7. "Vaporsaver™ 1" and "The Permeator™ documentation
8. USEPA Federal Register Advance Notice to Solicit Comments, Data and Information for Determining the Emissions Achieved in Ozone Attainment and Maintenance Areas From the Implementation of Rules Limiting the VOC Content of AIM Coatings, August 31, 2005
9. USEPA Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans

Copies of materials that were distributed at Workgroup meetings are included in Appendix C.

V. Initial Workgroup Control Measure Considerations

A. How the Workgroup Focused its Analysis on Control Measures

The Workgroup initiated discussions by evaluating the top 15 categories of point source VOC emitters (Figure 3) and the top categories of 15 area source VOC emitters (Figure 4) based on the NJDEP Draft 2002 Emission Inventory. After review of the top VOC emitters in the inventory, the Workgroup discussed specific sources.

Figure 3: Draft 2002 New Jersey Point Source VOC Emission Inventory Top 15 by SCC

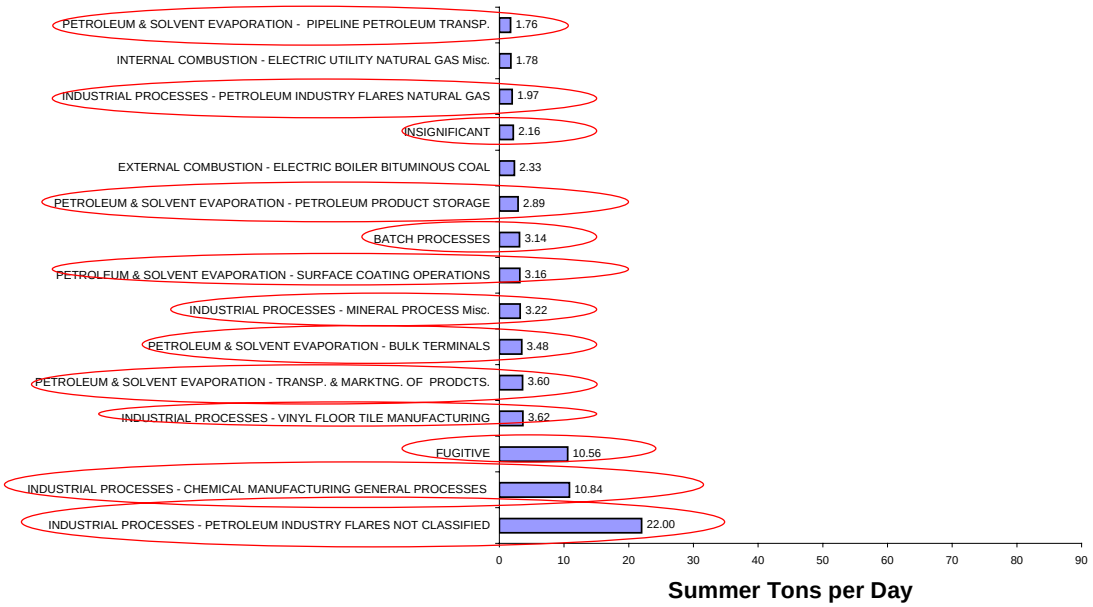
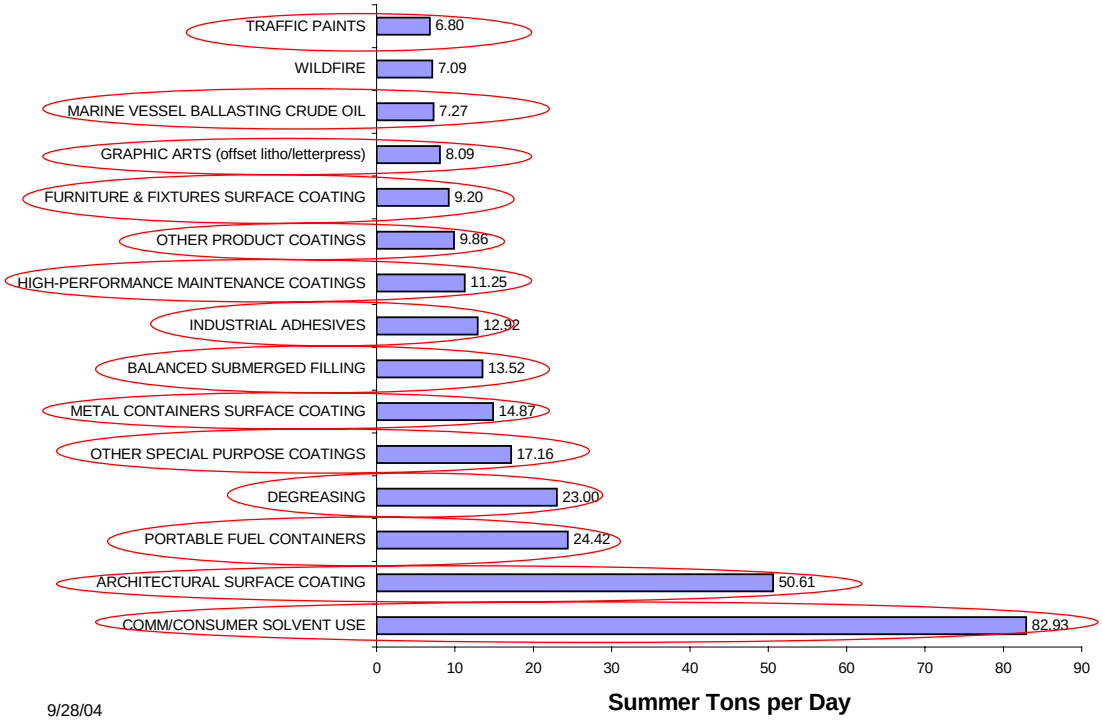


Figure 4: Draft 2002 New Jersey Area Source VOC Emission Inventory Top 15 by SCC



9/28/04

To facilitate discussion of control strategy ideas, the Workgroup leader, Bob Heil, initiated discussion by proposing several ideas to the Workgroup. These proposals were thoroughly discussed and were assigned proposal numbers VOC-010 and VOC-012. Proposals VOC-008, VOC-009, VOC-011, and VOC-015. were initiated by NJDEP permitting staff. Additionally, the provisions of NJAC 7.27-16, 7.27-23 and 7.27-24 were reviewed to stimulate conversation on existing control technologies required by regulations to currently control VOCs. This discussion lead to several control strategy suggestions from Workgroup participants.

B. Discussion of the Control Measure Evaluation Process

At subsequent Workgroup meetings, discussion of additional measures were pursued and all measures were reviewed initially for:

- Environmental Benefits
- Technical Feasibility
- Economic Feasibility
- Implementation Feasibility
- Enforceability
- Compliance Issues

Workgroup discussions focused on the technical and economic aspects of the control strategies, rather than the social benefits of the measure.

C. Review of all measures evaluated by the workgroup based on the criteria in Section B above.

Every measure proposed by the Workgroup was recorded on a proposal tracking form and assigned a tracking number. The “pros” and “cons” for each proposed measure were recorded on the tracking forms. Comments from Workgroup participants were also recorded on the tracking forms. Comments that did not fit into a particular category on the tracking form are included in Section IX of this report (Comments). A total of 18 measures were identified and the tracking form for each measure is included in Appendix D.

VI. Workgroup Prioritization of Measures for Further Consideration

The Workgroup first reviewed the potential list of measures for their perceived opportunity to reduce emissions. The measures were then evaluated based on the following criteria: economic feasibility, ease of implementation, ease of enforcement, and potential emission reductions. The prioritized measures are included in Table 2. An “X” in a specific column indicates that the criterion is a strong point for the proposed control strategy. The measures were ranked based on the information Workgroup members had supplied as a part of this exercise.

Table 2: Workgroup Proposal Ranking

		Economically Feasible	Ease of Implementation	Ease of Enforcement	Potential Emission Reductions
Most Promising					
VOC-001	Further regulation of degreasers	X	X	X	X
VOC-003	Additional control of consumer products				X
VOC-004	Accelerate conversion to new portable fuel containers				X
VOC-005	Reqiring new technology at gasoline stations to reduce vapors	X	X	X	X
VOC-011	Control of refinery flares	X		X	X
Promising					
VOC-002	Control of consumer products and AIM aerosol products through reactivity-based regulations	X			X
VOC-006	Improve gasoline dispensing through public outreach and education	X	X		
VOC-008	Further capture and control of emissions from bulk tank terminals				X
VOC-015	Investigate and control tank cleaning operations at large bulk tank terminals		X	X	
VOC-017	Improvements in leak detection and repair		X	X	
Least Promising					
VOC-010	Lower exclusion rate of NJAC 7:27-16.7		X	X	
VOC-012	Further control of landfill gases		X	X	
VOC-014	Require the use of "green" cleaning/maintenance products for State contracts		X	X	
Needs Further Investigation					
VOC-009	Further control of graphic arts sources		X	X	
VOC-016	Further reduce emissions from publicly owned treatment works				
Parking Lot Proposals					
VOC-007	Investigate marine ballasting operations				
VOC-013	Improve NJDEP emission inventory				
VOC-018	Update emissions factor for graphic arts sources				

VII. Detailed Review of Control Measures

This section includes a more in-depth discussion of the measures that members of the Workgroup viewed as most promising. The measures are listed in the order in which they were proposed.

Most Promising Control Measures

Proposal Number VOC-001	Further regulation of degreasers, primarily through educational and enforcement outreach

NJDEP has regulated degreasers for many years, pursuant to NJAC 7:27-16.6. Despite this regulation, the New Jersey Draft 2002 Emission Inventory shows VOC emissions from degreasers are 7,176 tons per year. In 2004, NJDEP further regulated degreasers by changing the requirements of NJAC 7:27-16.6 to essentially be equivalent to USEPA Maximum Achievable Control Technology (MACT) standards.

Discussion of degreasing operations was initiated by review of the inventory. A Workgroup participant suggested that the NJDEP inventory numbers for degreasing are too low, and that degreasing should be more heavily regulated. The participant recommended regulating all degreasers regardless of size and made the following points: 1) substantial health effects of operators (particularly small businesses) would be mitigated, and 2) the further regulation would be a driving force towards non-VOC materials.

The use of exempt, less reactive solvents for degreasing was discussed. A Workgroup participant stated that the exempt, less reactive solvents are as good, if not better in some applications, without any of the environmental or health hazards. Another point of discussion was the suggestion that there is a need for the NJDEP to increase the rule effectiveness of the existing regulation for degreasers.

In regards to the rule effectiveness issue, one easily accomplished suggestion was to issue an “Enforcement Alert” advising the regulated community of the updated rules and requirements. Additionally, there is a current disconnect in that all degreasers greater than 2 gallons are regulated by the newest edition of Subchapter 16, while the Permit applicability of Subchapter 8 has an applicability threshold of “greater than six square feet”. Thus, some degreasers are subject to the standard, but not permitting requirements. If all degreasers were required to obtain a General Permit, then the standards would be further distributed to the affected sources via General Permit Conditions.

The final outcome of the discussion of this proposal was that the majority of the Workgroup believes that degreasing industries (regardless of size) are already regulated to the maximum. The Workgroup suggests that outreach and enforcement alerts be increased to smaller facilities regarding the MACT standards, conducting efficient degreasing operations, and the potential use of less volatile and aqueous solvents. An additional option is to require all degreasers to obtain a general permit, which may increase rule effectiveness.

This measure will reduce VOCs emitted to the air thereby aiding in attainment of the 8-hour ozone and $PM_{2.5}$ standards. Reducing VOCs from degreasing operations will also benefit the health of those who perform these operations. Although implementation of this measure may require a registration and fees from smaller facilities, the measure is considered to be economically feasible because of the potential cost savings to regulated facilities from reducing solvent usage.

Some potential implementation issues associated with this measure are that reductions from this measure at smaller facilities may be difficult to quantify and that a general permit might not be an efficient method to track the number of degreasers that are regulated.

Proposal Number VOC-003	Additional control of Consumer Products

The VOC emissions from Consumer Products are quantified in the New Jersey Draft 2002 Emission Inventory as 30,186 tons per year (classified as commercial/consumer solvent use). These emissions are high in New Jersey because they are calculated on a population basis and New Jersey has a large population.

The Workgroup examined consumer products and was provided with input from some representatives of major consumer product manufacturers. Specifically, the current status of California's consumer product regulations was reviewed. The review was of significance in that many major manufacturers formulate to a "global standard", which means there is one nationwide formulation (or in some cases, one worldwide formulation) that adheres to the most stringent environmental regulations. Implementation is not a major issue for the large manufacturers that formulate on a global or national basis. Some smaller regional manufacturers formulate on a more local or regional basis and may have more difficulty both technically and economically in complying with additional regulations.

The current New Jersey regulations on Consumer Products are based on the OTC model rules. The newest initiative in California is "CONS-2" and is being

questioned by Consumer Product manufacturers on the grounds of technical and economic feasibility. California is looking to achieve reductions of 10-30 TPD from the implementation of this rule. California is in the process of analyzing the results of a consumer product survey. Workgroup members reported that the survey was not complete as of September 2005. The California rulemaking schedule has been altered and a rule will not go into effect until the end of 2006. Some Workgroup members have expressed concern over California's delayed CONS-2 schedule and feel that it would be premature for New Jersey to move forward with a CONS-2 rulemaking prior to learning the end result of California's rulemaking process.

The Workgroup recommends that NJDEP consider adoption of additional controls for consumer products. The Workgroup also recommends that the State continue to work with the USEPA on programs that would grant SIP credits without the State being required to adopt their own command and control regulations. This could save the State resources in the long run without sacrificing the SIP credits that could be obtained.

For additional information pertaining to this proposal, please refer to Appendix E (White Papers). Two white papers were submitted pertaining to this proposal.

Proposal Number VOC-004	Accelerate conversion to new Portable Fuel Containers through educational outreach to the public and by considering a phase in mandatory change-out

Portable fuel containers (PFCs) accounted for an estimated 24.42 summer tons per day (8,887 tons per year) in the New Jersey Draft 2002 Emission Inventory. The New Jersey Consumer Product Rule (Subchapter 24) includes a new section on PFCs. This section became effective January 1, 2005. The Workgroup discussed accelerating the changeover to the new PFCs in order to accelerate emission reductions from this source. This concept was based on the concern that PFCs typically have a long consumer life span.

The Workgroup recommends accelerating a changeover by a multi-tiered approach. Initially, a public educational campaign could be developed to inform consumers of the environmental benefits of the new PFCs. Secondly, a change-out program could be implemented. A possible funding source for the changeout program could be a Supplemental Environmental Project (SEP). A SEP is an environmentally beneficial project that a violator voluntarily agrees to perform as part of the settlement of an enforcement action. Another option recommended by the Workgroup is the consideration of a mandatory change out program that would prohibit gas station attendants from filling the old PFCs. Implementation of an educational program will get the subject on the public's radar screen and offer them an opportunity to be proactive. A mandatory program will help to complete the turnover of older PFCs.

The suggested measures are viewed as technologically feasible by the Workgroup since new PFCs are currently readily available on the market. The possible use of SEP funding for a changeout program makes the measure potentially economically feasible.

Proposal Number VOC-005	Requiring new technology at gasoline stations which reduces vapors, especially at larger vacuum assist stations

The dispensing of gasoline is a large contributor of VOC emissions in New Jersey.

A member of the Workgroup shared the following proposal with the Workgroup: an add-on control device located at the vent pipes to minimize emissions from working and breathing losses. This control technology is being tested in California and at the member's company. The final results on technological feasibility are expected soon. This technology is most effective on stations that utilize "Vacuum assist" technology and less effective on "Vapor balance" systems. The estimated cost is a capital expense of $30,000 to $50,000, which may be recuperated in product loss minimization.

According to NJDEP Minor Source Support staff, it was estimated that "vacuum assist" exists at most of the larger retail gasoline stations in New Jersey and thus further controls at the larger stations would reduce VOC emissions.

Additional information on this proposed technology is included in Appendix C.

The Workgroup recommends that the NJDEP further evaluate applicability of this new technology as an emission reduction technology. If deemed appropriate, NJDEP should consider requiring use of this technology on Stage 2 vacuum assist systems.

An alternative suggestion is that the technology could be required for new service stations. Small/independent facilities could be provided with economical incentives (i.e. tax deductions) to encourage installation of the device.

For additional information pertaining to this proposal, please refer to Appendix E (White Papers). One white paper was submitted pertaining to this proposal.

Proposal Number VOC-011	Control of refinery flares by enhanced control of currently uncontrolled predictable gas streams

Discussion of refinery flares was initiated by a NJDEP permitting representative. Refinery flares are one of the largest categories of point sources with estimated emissions of 22 tons per day (8,024 tons per year) in the New Jersey Draft 2002 Emission Inventory. This is despite the fact that there are very few flaring sites in New Jersey.

Control technologies are not only technically feasible, but also economically feasible. NJDEP permitting staff noted that basic engineering study by John Zink, done for a refinery in connection with a New Jersey Administrative Consent Order (ACO), shows that a refinery flare gas recovery system has a 2-3 year payback. This is because the recovered gas is a valuable fuel.

The implementation issue that arises is that various enforcement actions and consent decrees with the USEPA may have already regulated some of these controls. However, the overall benefit from reducing refinery flare emissions is significant and the conclusion was to recommend monitoring and recording of flare events and installation of a gas recovery system.

Promising Control Measures

Proposal Number VOC-002	Control of Consumer Products and AIM aerosol products through the use of reactivity based regulations

A Workgroup member gave a presentation at the July 12 meeting discussing reactivity-based programs for control of VOCs in consumer products and coatings. Initiated in California and supported by many consumer products and architectural coating manufacturers, the concept is to regulate a substance not simply based on the mass of VOC, but on the reactivity of the VOC being used. All VOCs do not react the same in atmospheric conditions. As a note, some organic compounds that volatilize are exempt from VOC definitions in that they have been proven to be photochemically unreactive (e.g. acetone, perchloroethylene, etc.). The reactivity concept takes that a step further and examines how various VOCs photochemically react.

Some of the benefits of reactivity-based rules cited in the presentation were that reactivity based rules: 1) Can yield greater environmental benefits by encouraging use of lower reactivity ingredients, 2) Can impose less burden and cost on product manufacturers and the public, and 3) Will make possible the

effective measurement and regulation of VOC reactivity with available scientific technologies. Workgroup participants also noted that reactivity-based regulations will not work for all products and that sometimes products can become more reactive if product formulations are changed.

Arguments against mass-based programs for regulating formulated products cited in the presentation included that mass based regulations: 1) Do not consider each VOCs relative potential to contribute to the accumulation of ozone, 2) Treat all non-exempt VOC emissions alike, although their potential contributions to the accumulation of ozone vary greatly, 3) Can result in performance problems if VOC content is “squeezed” too hard, and 4) If a coating has to be applied more often, or if a cleaner has to be used in greater quantities, the benefits of new formulations are reduced – more likely to be an issue with mass-based programs.

The greatest impact of a reactivity-based regulation is in the consumer product realm, which is one of the largest New Jersey VOC area sources. VOC emissions from commercial and consumer solvent use account for 30,186 tons per year (82.93 tons per day) in the New Jersey Draft 2002 Emission Inventory. California currently has reactivity guidelines in place for aerosol products, as well as extensive baseline science on the reactivity of various compounds. Additionally, the USEPA has recently announced that it might propose a reactivity-based regulation for aerosol coatings, similar to the California rule, at the end of 2005.

In conclusion, the Workgroup recommends that NJDEP 1) Consider adoption of California’s aerosol coating reactivity based emission standard, 2) Move toward reactivity based emission standards for consumer and AIM products as their technical feasibility is demonstrated, and 3) If the USEPA proceeds with a National reactivity-based regulation for aerosol coatings on a schedule that would allow New Jersey to receive SIP credit by 2009, then the Workgroup recommends that New Jersey should not go forward with a state rule.

A reactivity-based approach would require the NJDEP to develop and implement a reactivity policy, but it appears that the results would be quantifiable and SIP acceptable.

A compliance issue with implementing a reactivity-based regulation is that a reactivity-based regulation may be difficult to enforce. NJDEP will have to know the exact chemical constituents of each product. The exact formulations will be subject to regulation. This may cause difficulty with enforceability for products that are formulated seasonally or batch by batch. There may also be legal issues with requests for confidential business information.

There may also be a transport issue – some formulations are not necessarily less reactive, they are just slower to react (they react further from the point where they emitted).

In general, there were some implementation concerns for certain product categories, but the concept of reformulating to a less reactive formulation has already been introduced in California and implementing a reactivity-based rule for aerosol coatings would be an opportunity for New Jersey to be a leader in this effort.

For additional information pertaining to this proposal, please refer to Appendix E (White Papers). Three white papers were submitted pertaining to this proposal.

Proposal Number VOC-006	Improve gasoline dispensing through a variety of public outreach and education efforts

The Workgroup felt the need to address gasoline-dispensing issues. The issues discussed included:

- “No topping off” by attendants
- Improved operations and maintenance of Stage II vapor recovery equipment
- Fleet vehicle refueling
- Weights & Measures requirements for pump calibration testing at retail gas stations

Specifically, the Workgroup believed that while not quantifiable in tons per day, emissions could be reduced by educating attendants to not top off tanks. Workgroup members stated that “Stop at the click” initiatives at gas stations are underway in Texas, California, Pennsylvania, Delaware, and other states. Additionally, County Health Department staff felt that some stations have poorly maintained Stage II controls which contribute to emissions and believed that an increase in enforcement presence would be beneficial. Some Workgroup participants thought fleet fueling should include Stage II. In addition, the issue of conducting Weights & Measures testing during ozone season was raised. Workgroup participants also suggested a new system for returning liquids back to storage tanks after pump calibration tests (to control the vapors that escape).

The Workgroup concluded that these are good business practices that should be supported by the NJDEP.

Proposal Number VOC-008	Further capture and control of emissions from bulk tank terminals

The issue of emissions from large bulk storage tanks was presented by NJDEP permitting representatives. These tanks represent significant emissions in the Draft 2002 New Jersey Emission Inventory, estimated at 1359 tons per year. These tanks are located at large-scale port area operations located predominately in Northern and some Southern New Jersey locations.

Representatives from industry disagreed that further controls were technologically or economically feasible, stating that internal floating roof tanks and external floating roof tanks with cover demonstrate a State of The Art (SOTA) level of control. Tank farm representatives also stated that there have been advancements in control device (floating roofs) materials and construction that have not been accounted for in the TANKS 4.0 program (the current mandatory USEPA emission calculation methodology), therefore emissions calculated for floating roofs may be overestimated. An implementation issue that arose was the need for these facilities to comply with the American Petroleum Institute (API) requirements. Additionally, new source performance standards (NSPS) and MACT standards address new tanks but many older tanks may not be subject to more stringent requirements (MACT standards address both existing and new sources, however, the newer sources are require to apply higher levels of control). Finally, some industry representatives wished to ensure that any further controls would only impact tanks of a certain size threshold, for example, those greater than 10,000 gallons. Overall, it was agreed that additional controls could be considered for the largest of the bulk tanks, provided that the control meets API requirements and is economically feasible on a cost per ton analysis.

The Workgroup concluded that additional controls could be considered and additional tanks could potentially be required to meet the standards imposed on newer tanks by federal NSPS and MACT standards. Applicability thresholds based on size, volatility, and other factors as developed for the NSPS and MACT regulations, should be retained or applied to tanks they do not apply to.

Proposal Number VOC-015	Investigate and control tank cleaning operations at large bulk tank terminals

NJDEP permitting representatives suggested capturing and controlling emissions from the cleaning of bulk storage tanks as these appear to be substantial in size. Several representatives from industry stated that a single tank cleaning event can produce significant emissions, however, they assert that tank cleanings are done very infrequently, perhaps once every ten years or more, as outlined by API. NJDEP staff asserts that with the large number of storage tanks in the port areas, this is a significant emission source.

The Workgroup concluded that emissions from bulk tank cleaning could be reviewed for safety and feasibility of capture and control. At a bare minimum, the NJDEP should consider a control measure plan that would provide operational guidelines to reduce emissions.

Although the technological feasibility for the safe use of physical control devices to control emissions from tank cleanings was not readily known by Workgroup members, it is believed that there are established techniques that could be utilized. Administrative control measures that were suggested included eliminating scheduled tank cleaning operations during ozone season for cleanings that would emit substantial quantities of VOCs.

Proposal Number VOC-017	Improvements in leak detection and repair by including previously unregulated sources, and using imaging technology to identify fugitive leaks and sources

One member of the Workgroup discussed the possibility of expanding Leak Detection and Repair (LDAR) regulations, specifically to non-traditional LDAR sources (such as heat exchangers) and non-traditional LDAR sites.

Examples from the State of Texas LDAR fly over study led to a more thorough discussion of this technology. In Texas, there is a program to identify previously unquantified large and small emission points via this technology. Details of this program can be found at the following website:
http://www.tceq.state.tx.us/nav/eq/aircraft.html

On a more localized scale, the same technology, in handheld equipment, can be used to identify process leaks or other emission points. One consultant member of the Workgroup stated that clients have inquired about using this technology at their facilities. The cost of this technology is approximately $80,000.

While technologically feasible, several implementation issues were discussed, including: whether to require facilities to conduct their own audits and submit the

results to the NJDEP or equip NJDEP staff with this technology to be used as an enforcement tool.

The use of this technology can be environmentally beneficial in that it could be used to improve actual emission reductions while using the results as a public outreach tool. This tool could also potentially be used by NJDEP to identify emissions at sources such as gasoline dispensing or other similar sites. The Workgroup recommended the use of this technology, as appropriate

White Papers

All members of the Workgroup were encouraged to provide "white papers" on specific measures to assist the NJDEP in its subsequent deliberations on measures to include in the SIP. NJDEP received 8 white papers from Workgroup participants and their associates. The white papers specifically address proposals VOC-002, VOC-003, VOC-005, VOC-009, VOC-010, VOC-013, VOC-016, and VOC-018. Each "white paper" is included in Appendix E. Comments that were provided with intent to supplement a specific white paper are also included in Appendix E.

Additional Control Measures Discussed by the Workgroup

The following issues and control strategies were discussed at some length by the Workgroup, but are considered to be the least promising control measures.

- Lowering the exclusion rate of NJAC 7:27-16.7 to include all surface coating operations using more than one gallon per day of coating was not recommended due to the unknown amount of emission reductions and possible burdens on smaller businesses. Additionally, many Workgroup members did not believe that the measure would result in a significant decrease of VOC emissions.

- Further controls on landfill gases was not recommended based on the belief that many major landfills are controlled by gas to energy projects, or subject to NSPS or MACT standards. The Workgroup suggested that there might be a benefit to the establishment of a NJDEP SOTA policy for landfills.

- The use of “Green” consumer products by state agencies and contracts was not recommended by the Workgroup in that the majority of participants agreed that this measure would not be feasible due to technical, economic, environmental, and implementation issues.

- Further control of graphic arts sources was not strongly recommended for many reasons outlined by representatives of the graphic arts industry as noted in their white paper presentation that is included in Appendix E.

- The proposal to further control Publicly Owned Treatment Works was raised late in the process and was not further discussed by the Workgroup. Additional information pertaining to this proposal was submitted to NJDEP after the last Workgroup meeting. This information is included as a white paper and included in Appendix E of the Workgroup report.

- Marine ballasting, inventory issues, and updating the emissions factor for graphic arts sources are discussed in Section VIII (Summary of "Parking Lot" Issues).

VIII. Summary of "Parking Lot" Issues

This section outlines any issues discussed that were not directly related to the evaluation of a control measure, but were related to the source areas under review by the group. The following "Parking Lot" Issues were encountered during the course of this exercise:

1. Proposal VOC-007: Investigate Marine Ballasting Operations

During review of the top 15 Area Source VOC emitters in the Draft 2002 New Jersey Emission Inventory, the Workgroup examined emissions from marine ballasting from crude oil. According to the inventory, emissions from marine ballasting from crude oil were 7.27 tons per summer day. Several representatives from marine terminals disputed the actual existence of these emissions. The marine ballasting emissions are caused by vapors displaced from a tanker when the ballast is loaded. Workgroup participants stated that the ballasting of crude oil is extremely rare in New Jersey ports. First, one Workgroup participant stated that many tankers have dedicated ballast compartments, which do not require displacement. Of those that do not have dedicated ballast compartments, most of the ballast water has to be sent to a controlled tank (floating roof) due to water quality issues. Second, Workgroup participants stated that there are no ballasting emissions associated with double-hulled tankers. In addition, in 2010, Federal law will require all tankers in United States waters to be double hulled and industry representatives stated that currently nearly all tankers are double hulled. Therefore, based on these points, industry representatives felt that there were no VOC emissions from "marine ballasting of crude oil".

Therefore, the Workgroup concluded that this inventory category should be reviewed with the USEPA as it appears that these types of emissions no longer occur because tankers either have double hulls or ballast only tanks. In addition, new rules will only allow double hull tankers in United States waters starting in 2010.

2. Proposal VOC-013: Improve NJDEP Emission Inventory

The Workgroup spent a large portion of the June 29 and July 12 meetings discussing the Draft 2002 New Jersey Emission Inventory. Workgroup participants were interested in how area source emissions are calculated and the top emitters. The NJDEP staff presented the emissions Inventory, specifically the NJDEP's 2002 Draft Emission Inventory for area sources and point sources, in an attempt to target the areas of greatest emission reduction potential. The introduction of this topic led Workgroup participants to question the validity of the data and production of the report.

Various industry representatives and/or trade group representatives questioned the estimated emissions of their inventory sector. In response, NJDEP staff made the emission calculations available. This led to a lengthy discussion and speculation of the actual inventory numbers.

The Workgroup concluded that the NJDEP should consider forming a Workgroup or reaching out to specific sectors of industry to help improve the inventory and consider improvements to the software that is used to calculate emissions. This parking lot issue is discussed further in a white paper that is included in Appendix E.

3. Proposal VOC-018: Update Emissions Factor for Graphic Arts Sources

Several comments were received from a representative of the graphic arts industry pertaining to the calculations of graphic arts in the New Jersey Draft 2002 Emission Inventory. Two points were discussed: 1) The representative stated that the emission factor for graphic arts inventory calculation is in error and that it should be replaced with a more up-to-date emission factor (specifically, the AP-42 factor 0.8 lbs/capita/year), and 2) The graphic arts industry would prefer the NJDEP use the USEPA funded, LBJ School of Business, University of Texas factor (0.05 lbs/capita/year). Additionally, the New Jersey 2002 Draft Emission Inventory assumes that 46% of the graphic arts inventory constitutes lithography and letterpress and 54% constitutes rotogravure & flexography as per AP-42 5th Edition Section 4.9.1.2. The representative of the graphic arts industry stated that this appears to be a broad generalization.

The graphic arts representatives of the Workgroup have submitted a white paper that discusses this proposal in further detail. The white paper is included in Appendix E. Representatives of the graphic arts industry have also requested that this proposal be addressed in conjunction with VOC-013.

IX. Comments

Several comments were made during the Workgroup meetings and during the comment period subsequent to the last Workgroup meeting that did not fit into a particular proposal. These comments include discussion of potential control measures that required additional research (outside of the scope of this exercise) and comments pertaining to dissenting opinions of Workgroup members.

- Graphic Arts representatives comment on VOC-010 – *"based on our notes, Tracking #VOC-010, Lower exclusion rate for surface coating sources, was to be broken out into two distinct tracking proposals, 10 for surface coating operations, and 10A for graphic arts. If the Workgroup decides to not separate the two, then we would recommend that our comment, as included on the attached page, be included in the final working group proposal".*

  This proposal was intended to pertain specifically to surface coating operations, not graphic arts operations. No additional tracking item was created.

- NJDEP permitting staff commented RE: VOC-010: "These surface coating sources are similar in nature to the graphic arts sources. Therefore all should meet the SOTA manual or California South Coast RACT (reasonably available control technology) standards (whichever is the most stringent) and those that have controls should meet 100% capture and 95% destruction".

- A Workgroup member suggested that New Jersey should consider ways to encourage formulators to develop alternative product formulations that, on a reactivity adjusted basis, meet or exceed mass-based requirements.

- A Workgroup member suggested stating in the report that the NJDEP consider implementing any of the proposed control measures on a seasonal basis if it is more feasible.

- NJDEP permitting staff commented RE: VOC-009: "If these graphic arts sources have controls, the controls should be subject to 100% capture and 95% destruction. Also all the sources should meet the conditions in the SOTA manual".

- A Workgroup member who represents a New Jersey refinery suggested that the NJDEP Draft Emission Inventory was inconsistent with the Mid-Atlantic Regional Air Management Association (MARAMA) inventory, and thus emission reductions may be less than expected. Based on this opinion, the Workgroup member concluded that the refinery flare proposal should be reviewed as a lower priority.

- A consumer product representative stated, “Because of the wide variety of purposes served by personal care products, and the need to meet stringent regulatory requirements for efficacy and safety, we urge New Jersey to take a very cautious approach to reactivity as a solution for consumer product emissions. “

- A consumer product representative stated that “New Jersey should temper its approach to consumer products, placing a strong focus on working with USEPA on a solution that will provide SIP credit for voluntary emission reductions while working with its colleagues in other OTC states as the actual requirements of the eight-hour ozone standard become clearer to find an approach that will allow continued uniformity and a continued free flow of important consumer products across state lines.”

X. References

1. “Developing Air Emission Control Strategies: A Collaborative Effort.” Reducing Air Pollution Together, New Jersey Department of Environmental Protection. July 19, 2005. http://www.state.nj.us/dep/airworkgroups/index.html (23 September 2005).

2. “Volatile Organic Compounds from Processes and Consumer Products.” Workgroup Presentations, Reducing Air Pollution Together, New Jersey Department of Environmental Protection. June 29, 2005. http://www.state.nj.us/dep/airworkgroups/docs/voc_workgroup_presentation.pdf (23 September 2005).

3. “8-Hour Ozone.” Workshop Presentations, Reducing Air Pollution Together, New Jersey Department of Environmental Protection. June 29, 2005. http://www.state.nj.us/dep/airworkgroups/docs/ozone_sip_presentation.pdf (23 September 2005).

4. In Pursuit of Clean Air: A Review of State and Federal Policies Affecting New Jersey’s Air Quality. Governor James E. McGreevey, State of New Jersey and Commissioner Bradley M. Campbell, NJ Department of Environmental Protection. April 2004.

A Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared by the Volatile Organic Compounds from Processes and Consumer Products Workgroup

Appendix A: List of Workgroup Participants

October 31, 2005

Workgroup Name: Volatile Organic Compounds from Processes and Consumer Products

Workgroup Leader: Bob Heil, NJDEP Compliance & Enforcement

Workgroup Participants:

Umair Ansari	Estee Lauder Companies
Marge Baumhauer	Graphic Arts Association
Ed Biedell	Terranext
Pat Brown	Chevron
Victor Ciarlante	Selas Fluid Processing Co./Thermatrix
Luis A. Comas	Sunoco
David Dickerson	National Marine Manufacturing Association
Michelle Donohue	Graphic Arts Association
Dan Forestiere	Sherwin-Williams
Cara Fox	Dupont Chambers Works
Barbara Francis	American Chemistry Council
Ellen Gulbinsky	Association of Environmental Authorities
Toby Hanna	ERM
Robert A. Hunt	Mannington Mills, Inc.
Vicki Keenan	Association of Graphic Communications
Marci Kinter	Specialty Graphic Imaging Association
Michael Krugman	Estee Lauder Companies
Doug Lafayette	Conoco Phillips
Rob Mahler	Church & Dwight
Asha Matieda	Passaic Valley Sewerage Commissioners
Bob May	Synergy Environmental
Heidi McAullife	National Paint and Coatings Association
Richard A. Moore Jr.	Alton Environmental Services LLC
Dena Mottola	NJ Public Interest Research Group
Eileen Moyer	Reckitt Benckiser
Ron Ragucci	EnviroTrades
Tim Roessler	IMTT – Bayonne
Mark Roskein	Somerset County Department of Health
Tony Russo	CCNJ/NJPC
Gwen Schell	Griffin Pipe Products Co.
Gregory K. Scott	Roux Associates, Inc.
Richard Siller	Amarada Hess
Robert E. Smyth	TES Technologies/ Smyth, Inc.
Michael Tsakaloyannis	Clough Harbour Assoc.
Christine Visnic	Merck & Co., Inc.
Josh Worth	Wawa, Inc.
Joseph Yost	Consumer Specialty Products Association
Rosemary T. Zaleski	ExxonMobil Biomedical Sci.
Bob Zaphiros	Pechter's Baking Group LLC

Workgroup State Team Members:

Tonalee Key, Co-Facilitator, NJDEP Bureau of Air Quality Planning
Nicholle Jackson, Co-Facilitator, NJDEP Bureau of Air Quality Planning
Mike Adhanom, NJDEP Air Permitting
Max Friedman, NJDEP Air Permitting

Workgroup State Participants:

Leslie Bates	NJDEP
Michael DiGiore	NJDEP
Hiram Oser	NJDEP
Mike Sabol	NJDEP
Elizabeth Strochak	NJDEP

A Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared by the Volatile Organic Compounds from Processes and Consumer Products Workgroup

Appendix B: Workgroup Meeting Summaries

October 31, 2005

SUMMARY

Prepared by _Nicholle Jackson
On Friday, July 1, 2005

Volatile Organic Compounds from Processes and Consumer Products Workgroup Meeting

Held June 29, 2005
War Memorial, Trenton, NJ
Meeting called by: NJDEP BAQP
Co-Facilitator: Tonalee Key

Attendees:

Name	Affiliation
Bob Heil	Group Leader, NJDEP
Nicholle Jackson	Co-Facilitator, NJDEP
Mike Sabol	Team Member, NJDEP
Umair Ansari	Estee Lauder Companies
Victor Ciarlante	Selas Fluid Processing Co.
David Dickerson	National Marine Manufacturing Association
Michael DiGiore	NJDEP
Michelle Donohue	Graphic Arts Association
Cara Fox	Dupont Chambers Works
Ellen Gulbinsky	Association of Environmental Authorites
Toby Hanna	ERM
Robert A. Hunt	Mannington Mills, Inc.
Michael Krugman	Estee Lauder Companies
Richard A. Moore Jr.	Alton Environmental Services LLC
Ron Ragucci	EnviroTrades
Tim Roessler	IMTT – Bayonne
Gwen Schell	Griffin Pipe Products Co.
Gregory K. Scott	Roux Asociaties, Inc.
Robert E. Smyth	TES Technologies/ Smyth, Inc.
Christine Visnic	Merck & Co., Inc.
Josh Worth	Wawa, Inc.
Rosemary T. Zaleski	ExxonMobil Biomedical Sci.
Bob Zaphiros	Pechter's Baking Group LLC

Materials: [Workgroup Leader VOC Presentation]

Discussion [1 Hour]

Topic 1: Logistical Discussion of the Workgroup

Discussion: Webpage: http://www.nj.gov/dep/airworkgroups/
e-mail: airworkgroupvoc@dep.state.nj.us
Participation can occur by e-mail or phone if one cannot make a particular future meeting

Conclusion: Next meeting: July 12, 2005 at Somerset County OEM, details at http://www.co.somerset.nj.us/trainingacademy.html

Action Items/Person(s) responsible/Deadline: Detailed Agenda for next meeting – NDJ is responsible

Topic 2: Open Discussion

Discussion:

- Consumer Product issues – Discussion included but was not limited to global formulations, new proposals and reactivity based regulations.

- Industrial source issues – Comments were received regarding specific concerns from various and diverse manufacturers or trade associations. One commenter presented the idea of seasonally based ozone regulations.

- Inventory Improvements – Extensive questions and comments were received questioning NJDEP Emission Inventory, specifically area sources, the top emitters and the calculations used in obtaining these inventories. Additional concerns were raised about some specific point sources, notably airport emissions.

- Other discussion — Many other ideas were floated and will be considered further, for example the requirement for government contracts to include "green" consumer products.

Conclusion: No conclusions at this time

Action Items/Person(s) responsible/Deadline:

Wrap-up [10 minutes]

Based on the discussion at this meeting, the following topics will be discussed at the next meeting on July 12, 2005:

1. Consumer Products (Compare NJ to other states, such as CA)
2. Industrial Sources (Discuss the point sources that are regulated by NJAC 7:27-16)
3. Inventory Improvements
4. Less represented topics (reactivity-based regulations, RACT, etc.)

NJDEP staff will prepare a breakout of 2002 VOC area sources by category with a minor explanation of calculations prior to the next meeting.

SUMMARY

Prepared by Nicholle Jackson
On Wednesday, July 20, 2005

Volatile Organic Compounds from Processes and Consumer Products Workgroup Meeting

Held July 12, 2005
Somerset County Office of Emergency Management Training Building, Hillsborough Township, Somerset County
Meeting called by: Bob Heil, Group Leader
Co-Facilitators: Tonalee Key, Nicholle Jackson

Attendees:

Name	Affiliation
Ed Biedell	Terranext
Pat Brown	Chevron
Michael DiGiore	NJDEP
Michelle Donohue	Graphic Arts Association
Dan Forestiere	Sherwin-Williams
Cara Fox	Dupont Chambers Works
Toby Hanna	ERM
Asha Matieda	P.V.S.C.
Eileen Moyer	Reckitt Benckiser
Hiram Oser	NJDEP
Ron Ragucci	EnviroTrades
Tim Roessler	IMTT – Bayonne
Mark Roskein	Somerset County Department of Health
Tony Russo	CCNJ/NJPC
Gwen Schell	Griffin Pipe Products Co.
Robert E. Smyth	TES Technologies/ Smyth, Inc.
Christine Visnic	Merck & Co., Inc.
Josh Worth	Wawa, Inc.
Rosemary T. Zaleski	ExxonMobil Biomedical Sci.

Materials: [Agenda, Minutes from June 29, 2005 VOC workgroup meeting, Workgroup Ground Rules, 2002 New Jersey Point Source VOC Emission Inventory Top 15, 2002 New Jersey Area Source VOC Emission Inventory Top 15, 2002 Periodic Emissions Inventory Area Source VOC Emissions Summer and Annual Statewide, Sample Area Source Calculation Sheets, Proposed VOC Tracking Form, Feedback Form]

Call to Order *[15 Minutes]*
Attendees Sign In
Review of minutes from the 6/28/05 Workgroup Meeting
Review of Ground Rules

Discussion [5.5 Hours]

Topic 1: Inventory Improvements

Discussion:

- Sample inventory calculation sheets were distributed for the two graphic arts, consumer products, and Gasoline Handling & Marketing, Tank Truck Unloading Loss (Balanced Submerged Filling Or Stage I)

- The 2002 area source VOC emission inventory was reviewed and discussed including the following:
  - Consumer products, including a consumer product survey done by CARB

- The 2002 point source VOC emission inventory was reviewed and discussed including the following:
  - There is concern amongst the workgroup that it will be difficult to get more emission reductions out of point sources
  - The workgroup expressed concern about a specific number for reductions. They would like to know a specific goal for VOC reductions
  - The frequency of inventory release was discussed. NJDEP stated that the inventory is calculated every three years.

- **Sub 8 permits**
  - There are approximately 50,000 Sub 8 permits issued by NJDEP vs. 300 Title V permits
- Workgroup members are concerned that Title V permit holders are taxed but not Sub 8 permit holders

Conclusion: The workgroup would like to know a more specific goal for emission reductions

Action Items/Person(s) responsible/Deadline:

1. NJDEP will post the full document containing the 2002 Periodic Emission Inventory Area Source Calculation Methodology Sheets on the VOC workgroup webpage prior to the next workgroup meeting
2. Upon review of 2002 consumer product inventory information, Eileen Moyer, Reckitt Benckiser will provide data to CSPA for review
3. NJDEP will supply information on the baseline that was used in the 2002 emission inventory for AIM coatings
4. NJDEP will consult with management to try to provide a more specific goal for VOC emission reductions prior to the next workgroup meeting
5. NJDEP will look into possibilities of calculating emissions from Sub 8 permits

Topic 2: Consumer Products and Area Sources

Discussion:

- Consumer Products and AIM regulations were discussed
- Degreasing - One participant suggested that the NJDEP inventory numbers for degreasing are too low and that degreasing should be more heavily regulated. The use of exempt, less reactive solvents for degreasing was also discussed.
- Gasoline Dispensing Facilities and the use of Portable Fuel Containers were discussed

- It was suggested that an enforcement alert/compliance advisory be issued to enforce NJAC 7:27-16.6 (Open top tanks and solvent cleaning operations)

Each item was noted and the proposals and continued discussion are located on the attached pages of VOC Tracking Proposal.

Conclusion: No conclusions at this time

Action Items/Person(s) responsible/Deadline:

1. Eileen Moyer, Reckitt Benckiser, will contact Doug Fratz of the Consumer Specialty Products Association (CSPA) about giving a presentation at a future workgroup meeting
2. Ron Ragucci, Envirotrades, will provide NJDEP with information on degreasing operations (reference numbers)

Topic 3: Industrial Sources Regulated by NJAC 7:27-16

Discussion:

- The workgroup discussed each subsection of NJAC 7:27-16

- The following concerns were raised by the workgroup:
  - There is concern amongst the workgroup that there is no "low-hanging fruit" left and that there are already too many MACT and RACT regulations in place
- There is concern amongst the workgroup about how facilities are given credit for the various MACT reductions. NJDEP will follow-up on this issue.

- The following operations were discussed:

  - **Marine Ballasting**
    - There is a possibility that by 2010, single-hulled vessels will no longer be permitted in US waters. Single hulled ships are being phased out gradually. The phase-out may affect the inventory numbers.

  - **Retail Gas Stations**
    - Vapor recovery systems – WAWA, Inc. has tried some new technologies that are not currently required by NJDEP
    - "Stop at the click" initiatives at gas stations – initiatives are underway in TX, CA, PA, DE, and other states
    - Gas pumps and hoses are not always well maintained which makes the vapor recovery system inefficient. Enforcement action may need to be taken.
    - Fleet gas refilling
    - Calibration testing methodology used/required by Weights and Measures – currently no vapor recovery system is used

  - **Graphic Arts Industry**
    - A concern was raised that graphic arts operations should be differentiated from surface coating operations

  - **Leak Detection and Repair (LDAR)**
    - Workgroup members suggested a more consolidated LDAR rule to make it easier for both the facility and enforcement

---

Each item was noted and the proposals and continued discussion are located on the attached pages of VOC Tracking Proposal.

Conclusion: No conclusions at this time

Action Items/Person(s) responsible/Deadline:

1. Tim Roessler, IMTT Bayonne, will provide information regarding the concern about open hatches on barges (i.e. what type of cargo? Liquids or solids? Type of liquids? Possible control measures? Enforcement actions?)
2. Josh Worth, Wawa, Inc., will provide literature and CARB Executive Order regarding retail gas station technology (membranes)
3. NJDEP will provide more information about initiatives in other states to stop topping off gas tanks
4. NJDEP will look into retail gas station pump calibration testing methodology used/required by Weights and Measures
5. Michelle Donohue, Graphic Arts Association, will provide literature about the printing process and more accurate emissions numbers for graphic arts operations
6. NJDEP will look into providing additional graphic arts inventory information (if available)

Topic 4: Reactivity-Based Regulations
Discussion:

- Rosemary Zaleski gave a brief presentation on Successfully Creating a Reactivity-Based Program for Control of VOCs in Consumer Products and Coatings on behalf of the American Solvents Council of the American Chemistry Council.

- Participants commented that reactivity-based regulations will not work for all products and that sometimes products can become more reactive if product formulations are changed.

Conclusion: No conclusions at this time

Action Items/Person(s) responsible/Deadline: None at this time

Wrap-up [10 minutes]

- Assignments for the next meeting were discussed (they are included in the action items sections above)

- A feedback survey was distributed to the workgroup. The results of the survey will determine whether or not the group breaks into subgroups, agenda for the next workgroup meeting, and the logistics for the next meeting

SUMMARY

Prepared by Bob Heil
On Friday, August 19, 2005

Volatile Organic Compounds from Processes and Consumer Products Workgroup Meeting

Held August 9, 2005
Somerset County Office of Emergency Management Training Building, Hillsborough Township, Somerset County
Meeting called by: Bob Heil, Group Leader
Co-Facilitators: Tonalee Key, Nicholle Jackson

Attendees:

Name	Affiliation
Hiram Oser[1]	NJDEP – Air Enforcement Program
Eileen Moyer[1]	Reckitt Benckiser
Heidi McAullife[1]	NPCA (via speakerphone)
Rob Mahler[1]	Church & Dwight
Rosemary Zaleski	ExxonMobil Biomedical Sciences
Ed Biedell	Terranext
Richard Moore	Alton Envt. Services
Tim Roessler	IMTT – Bayonne
Josh Worth	Wawa, Inc
Pat Brown	Chevron
Mike Adhanom,	NJDEP – Air Permitting
Michelle Donohue	Graphic Arts Association
Tony Russo	Chemistry Council New Jersey
Michael Tsakaloyannis[2]	Clough Harbour Assoc.
Gwen Schell[2]	Griffin Pipe Products
Dena Mottola[2]	NJ PIRG
Victor Ciarlante[2]	Thermatrix
Bob Smyth[2]	TES Technologies
Bob May[2]	Synergy Environmental
Max Friedman[2]	NJDEP – Air Permitting
Doug Lafayette[2]	Conoco Phillips
Toby Hanna[2]	ERM

1- Indicates attendance at morning session only
2 - Indicates attendance at afternoon session only

Materials: Agenda, Minutes from July 12, 2005 VOC workgroup meeting

Call to Order *[15 Minutes]*
Attendees Sign In
Review of minutes from the 7/12/05 Workgroup Meeting

Discussion

Topic 1: Defining Workgroup Goals and Report Format

Discussion:

- Tonalee Key (NJDEP) discussed the overall goal of the workgroup and the use of the ideas generated by the group to be used towards SIP, modeling and VOC attainment in general
- Tonalee Key also presented some very preliminary draft numbers based on CAIR model that quantifies necessary emission reductions. Essentially, NJDEP needs to demonstrate as much VOC emission as possible with a very draft reduction goal of 600 Tons per Day of VOC+NOx (combined).
- Discussion also centered on the group's final report to NJDEP Management, the content and disclaimers of such a report and the uses of that report by NJDEP Air Quality Management.
- Final discussion on this topic was on timeframes of drafting a report and the presentation to Management. Workgroup leader Bob Heil emphasized the need to be on or ahead of schedule.
- Workgroup members suggested that proposals be quantified to the best extent possible in the final report

Conclusion: Workgroup members were given a clarification of the workgroup goals and are encouraged to begin formulating draft report ideas.

Action Items/Person(s) responsible/Deadline:

1. All workgroup members – Begin to draft report ideas and have items ready for discussion at next meeting.

Topic 2: Consumer Products/Architectural Coatings

Discussion:

- Eileen Moyer, Reckitt Benckiser, presented an overview of Consumer Products status, especially in regards to California standards and federal standards. Comparison of the OTC model vs. "Cons1" vs. proposed "Cons2" and the proposed reductions of these measures.
- Heidi McAuliffe, National Paint and Coating Council, participated via conference call and echoed and expanded upon the comments of Ms. Moyer
- Issues concerning Reactivity were also discussed as well as HAPs in Consumer Products and the use of hydrocarbon versus CO2 propellants
- Specific VOC Tracking Items were discussed (VOC-002 Reactivity Guidelines, VOC-003 Consumer Products, VOC-004 Portable Fuel Containers, and VOC–014 Green product purchases)

Conclusions: The workgroup has reached conclusions on each of the above tracking items. Specifically, nearly unanimous agreement on Reactivity Guidelines, Consumer Products, mandatory switch over to new Portable Fuel Containers and nearly unanimous disapproval of requiring "green products" in state contracts.

Action Items/Person(s) responsible/Deadline:

1. NJDEP to review the CA SIP reductions from CONS1, CONS2, and aerosol reactivity regulations.
2. NJDEP to attempt to quantify emissions reductions from changeover of Portable Fuel Containers

Lunch break 1200 – 1300 Hours

Revisitation of Topic 1 from the Morning for those attendees who chose to attend afternoon only session

Topic 3: Area sources by NJAC 7:27-16

Discussion:

- Discussion led by Tim Roessler, IMTT, on Marine Ballasting. He suggested that this number on the inventory is somewhat flawed in that marine ballasting occurs off shore at the "anchorage" and not necessarily in port, and that most ships are double hulled. Additionally, barges don't ballast.

- Discussion led by Michelle Donohue, Graphic Arts Association. Ms. Donohue disputed the emission factor for graphic arts inventory calculation by asserting the emission factor of 1.3 is in error and an emission factor of 0.8 or even 0.5 should be used instead. Additionally, Ms. Donohue pointed out that there is a SOTA established for graphic arts and further emission reductions on graphic arts would target primarily small businesses.

- Discussion led by Josh Worth, Wawa, with short presentation of technology on membrane technology to minimize breathing losses at retail gasoline dispensing stations. Discussion of applicability with ORVR and vacuum assisted vs. balanced air systems.

- **Discussion of VOC Tracking Proposals**:
- VOC-001 – Tabled extensive discussion until next meeting
- VOC-005 – New membrane technology to control VOCs from gasoline retail tanks.
- VOV-006 – Improve Gasoline dispensing – Various educational issues such as topping off, increased enforcement, etc.
- VOC-007 – Marine Ballasting , preliminarily determined to be a non-issue
- VOV-009 – Increase capture efficiency at Graphic Arts operations – discussion to be continued at next meeting
- VOC-010 – Lower exclusion rate for subchapter 16.7 – generally opposed by industry, continue discussion at next meeting.

Action Items/Person(s) responsible/Deadline:

1. NJDEP Air Permitting will attempt to identify how many graphic arts sources are not subject to the current SOTA standard for graphic arts sources.
2. NJDEP and Josh Worth to investigate the emissions from mandatory "Weights and Measures" calibrations

Topic 4: Industrial Point Sources covered under NJAC 7:27-16

Discussion:

- Discussion was initiated by NJDEP Permitting staff on the issue of emission reductions of bulk VOC (primarily gasoline) storage tanks and refinery flaring operations.
- Discussion of bulk tanks. NJDEP believes that emissions can be further reduced. Industry reps feel that internal floating roofs are the SOTA and emissions of all tanks may be overstated due to out of date USEPA emission factors. VOC Tracking Item VOC-008 to be continued at next meeting.
    - Discussion of Refinery Flares led by NJDEP Permit staff indicates that refinery flaring is a large point source of the emissions inventory and that reductions can be made that are economically viable. Also consideration that the flare issue should possibly include chemical plants with flares.
    - VOC Tracking item VOC-011 to be continued at next meeting.
    - Discussion of VOC from landfill gas. Bob Heil of Air Enforcement stated that his information was incomplete but area sources are a collection of very small or defunct sites that cumulatively account for 547 TPY VOC. Title V sources need to be looked at prior to next meeting, where VOC Tracking # VOC-012 to be continued.

New Business

- **Leak Detection and Repair (LDAR)**
    - A workgroup member suggested a further look at LDAR to include operations not currently covered by LDAR. The workgroup member also referenced a Texas study in which flyovers of petroleum and chemical sites using infrared technology identified sources and open hatched barges.
    - This item to be given a VOC Tracking number for extensive discussion at next meeting.

- **Tank Cleaning –**
    - NJDEP Air Permitting staff suggested that "Tank Cleaning" at large bulk facilities be investigated to determine emissions and potential future reductions of emissions from this process.
    - This item to be given a specific VOC Tracking number for extensive discussion at next meeting.

- **Wastewater Treatment Plants** –
    - One workgroup member questioned the emissions from Wastewater treatment plants. At the last meeting, representatives of WWTP stated that the new MACT standards were sufficient, however this needs to be reviewed and quantified at the next meeting and thus will be given a VOC Tracking number.

Action Items/Person(s) responsible/Deadline:

1. NJDEP and Tim Roessler to investigate subchapter 16 position on storage tanks, slotted guidepoles and tank cleaning operations.
2. NJDEP Air Permitting staff to attempt to quantify and provide scope of affected petrochemical and chemical plants affected by flaring issues.
3. NJDEP to provide further information on Point Source emissions from Landfill operations.
4. Workgroup members encourage to provide their experience on LDAR and the potential inclusion of operations not currently covered.
5. Workgroup members are encouraged to bring their experience of Wastewater Treatment Plants in regards to VOC and emission control. NJDEP to attempt to identify sources not subject to new standards.

Wrap-up [10 minutes]

- Logistics for the next meeting were discussed, including an offer by Chemistry Council of New Jersey to utilize their conference room. Location to be determined by NJDEP staff

- A feedback survey was distributed to the workgroup. The results of the survey will determine whether or not an emissions inventory subgroup is formed and the effectiveness of the webpage in disseminating information.
- Assignments for next meeting will be sent via e-mail to applicable members

SUMMARY

Prepared by Nicholle Jackson
On Tuesday, September 20, 2005

Volatile Organic Compounds from Processes and Consumer Products Workgroup Meeting

Held September 7, 2005
Somerset County Office of Emergency Management Training Building, Hillsborough Township, Somerset County
Meeting called by: Bob Heil, Group Leader
Facilitator: Nicholle Jackson

Attendees:

Name	Affiliation
Mike Adhanom	NJDEP – Air Permitting
Leslie Bates	NJDEP
Marge Baumhauer	Graphic Arts Association
Ed Biedell	Consultant
Pat Brown	Chevron
Luis A. Comas	Sunoco
Michelle Donohue	Graphic Arts Association
Dan Forestiere	Sherwin-Williams
Barbara Francis	American Chemistry Council
Max Friedman	NJDEP – Air Permitting
Toby Hanna	ERM
Vicki Keenan	Association of Graphic Communications
Marci Kinter	SGIA
Heidi McAullife	NPCA (via speakerphone)
Richard Moore	Alton Envt. Services
Hiram Oser	NJDEP – Air Enforcement Program
Tim Roessler	IMTT – Bayonne
Tony Russo	Chemistry Council New Jersey
Gwen Schell	Griffin Pipe Products
Richard Siller	Amarada Hess
Elizabeth Strochak	NJDEP
Michael Tsakaloyannis	Clough Harbour Assoc.
Christine Visnic	Merck & Co., Inc.
Joseph Yost	Consumer Specialty Products Association (via speakerphone)
Rosemary Zaleski	ExxonMobil Biomedical Sciences

Materials: Agenda, Minutes from August 9, 2005 VOC workgroup meeting, Workgroup Report Overview, Workgroup Report Timeline, USEPA Federal Register *Advance Notice to Solicit Comments, Data and Information for Determining the Emissions Achieved in Ozone Attainment and Maintenance Areas From the Implementation of Rules Limiting the VOC Content of AIM Coatings*, USEPA Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans

Call to Order

Attendees Sign In
Review of minutes from the 8/9/05 Workgroup Meeting

Discussion

Topic 1: Overview of Report Format and Timeline for Completion

Discussion:

- An overview of the format for the final report format was discussed
- The schedule for report completion was distributed to the workgroup. The schedule was revised based on comments received from workgroup members
- Members of the workgroup were encouraged to submit White Papers. The White Papers will be appended to the final workgroup report
- **September 30, 2005** is the deadline for workgroup members to submit information and white papers. Please send all information to airworkgroupvoc@dep.state.nj.us
- **October 14, 2005:** NJDEP Workgroup Team will complete preparation of the workgroup report and share with the workgroup for edits/comments
- If necessary, there will be a conference call or meeting scheduled for the week of **October 24-28** to discuss report revisions. This will be determined by the needs of the workgroup
- **October 31, 2005:** Deadline for submission of Final workgroup reports to NJDEP Commissioner

Action Items/Person(s) responsible/Deadline:

2. See deadlines above

Topic 2: Review of Tracking Items Previously Raised

Discussion:

- The workgroup revisited tracking items that were proposed at previous meetings. Please see "Draft Final Workgroup Proposals" to view the comments that were added to each tracking item.

Overview of Tracking Items Discussed:

- **VOC-001:** NJDEP permitting staff stated that the New Jersey standard for degreasers is now equivalent to the MACT standard. The majority of the workgroup believes that degreasing industries, regardless of size, are already regulated to the maximum. Members of the workgroup suggested that outreach and enforcement alerts be increased to smaller facilities regarding the MACT standards, conducting efficient degreasing operations, and the potential use of less volatile and aqueous solvents. An additional option that was suggested is to require all degreasers to obtain a general permit, which may increase rule effectiveness. Some workgroup members stated that a general permit might not be an efficient method to track the number of degreasers that are regulated.

- **VOC-002:** A representative of the National Paint and Coatings Association stated that the USEPA announced that it may propose a national reactivity-based regulation for aerosol coatings at the end of 2005. The rule will be based on California's rule. The representative stated that there may not be additional benefit to the State of New Jersey to accelerate a reactivity-based rule for aerosol coatings if the USEPA plans to propose a similar rule. The workgroup agreed that New Jersey will benefit from a reactivity-based regulation for aerosol coatings and should follow the progress of the possible national rulemaking.

- **VOC-003:** A representative of the National Paint and Coatings Association stated that CA is behind on the rulemaking schedule for Cons-2. The representative stated that it may be premature for NJ to consider proposing a rule similar to Cons-2 and should wait for CA to finish its rulemaking process. Another workgroup member stated that although some major large companies formulate on a global basis, other smaller companies formulate on a local/regional basis.

- **VOC-004:** The workgroup made no further comments on this proposal.

- **VOC-005:** It was suggested that the workgroup contact the NJ Petroleum Council and the Fuel Merchant Association for more information pertaining to this proposal. A petroleum industry representative volunteered look into this subject further.

- **VOC-006:** The workgroup suggested that the narrative on this subject in the workgroup report include a statement that the benefits of this proposal will be difficult to quantify.

- **VOC-007:** There were no further comments on this proposal. The proposal will be included in the "Parking Lot" issues section of the workgroup report.

- **VOC-008:** The workgroup discussed the need for this item to take into account an appropriate size threshold for VOC tanks, similar to how EPA handles HAP storage tanks in its MACT rules and how NJ handles tanks in its own VOC RACT rules. In the MACT rules, EPA is required by law to perform a cost benefit analysis relative to controlling emissions. This allows EPA to focus its efforts and the efforts of the regulated community on those sources that are more cost-effective to control. It was stated by a workgroup participant that with respect to a value for a size cut-off, many MACT standards use a cut-off of 10,000 gallons, which should be considered as part of any rule proposal for VOC storage tanks. After some debate among members of the workgroup, it was concluded that additional controls could be considered and that additional tanks could potentially be required to meet the standards imposed on newer tanks by federal NSPS and MACT standards. Size, volatility, and other applicability thresholds have been established based on a careful weighing of costs and benefits during the development of the NSPS and MACT regulations, and should be retained in any further regulatory development contemplated.

- **VOC-009:** Representatives of graphic arts trade associations stated the current SOTA requirements fulfill this proposal and that graphic arts should not be controlled further. There remains some concern on how many graphic arts operations have pre-1997 permits (SOTA creation) and the graphic arts association will attempt to help NJDEP quantify the number of potentially affected facilities. A graphic arts representative stated that the digital printing sector is not covered by SOTA requirements in New Jersey and that this may be an issue to evaluate. The graphic arts representatives suggested that a separate co-proposal be created for surface coating. Upon further evaluation, this idea was abandoned because surface coating operations are already required to have 90% capture efficiency under Sub 16.

- **VOC-010:** The workgroup made no further comments on this proposal.

- **VOC-011:** Some petroleum industry representatives expressed safety concerns with controls on refinery flares. It was suggested that each flaring incident should be recorded and analyzed. DEP suggested that volumetric flow rates and flare composition should be monitored and recorded, and that flare recovery systems should be installed and operated.

- **VOC-012:** It was concluded that an estimated 547 TPY of VOC is emitted from many closed and small landfills and do not warrant further review. Many large or active landfills have energy recovery systems. A State of the Art policy (possibly following NSPS standards) should be considered for landfills with potential to emit greater than 10 TPY.

- **VOC-013:** This proposal will be included in the "Parking Lot" issues section of the workgroup report. The workgroup concluded that the NJDEP should consider a workgroup for reaching out to industry to help improve the inventory and that improvements should be considered for the software that is used to calculate emissions.

- **VOC-014:** The workgroup made no further comments on this proposal.

- A workgroup member distributed copies of the following to the workgroup: 1) USEPA Federal Register Advance Notice to Solicit Comments, Data and Information for Determining the Emissions Achieved in Ozone Attainment and Maintenance Areas From the Implementation of Rules Limiting the VOC Content of AIM Coatings and 2) USEPA Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans.

Action Items/Person(s) responsible/Deadline:

3. "Draft Final Workgroup Proposals" will be distributed to the workgroup. Workgroup members may comment on the proposals until September 30, 2005. After this date, the proposal tracking forms will be appended to the workgroup report with only the comments that were received on or before September 30
4. Workgroup members must submit all additional tracking items by September 30, 2005
5. NJDEP will contact the individuals that volunteered to provide additional information for the workgroup report

Lunch Break

Topic 3: Review of New Tracking Forms

Discussion:

Overview of Tracking Items Discussed:

- **VOC-015:** Some workgroup representatives expressed safety concerns with adding additional controls to bulk storage tanks. Some workgroup representatives stated that the emissions from tank cleaning are minimal and that tank cleaning is conducted infrequently (once every 10-20 years on an API schedule). The workgroup concluded that Emissions from bulk tank cleaning could be reviewed for safety and feasibility of capture and control. The control may be a portable thermal oxidizer or other control measures may be adopted upon further review of the issue.

- **VOC-016:** It was concluded that this VOC source should be studied to determine whether or not there are significant emissions to be controlled. A workgroup member stated that the Association of Environmental Authorities is looking into this and may submit some information or a white paper.

- **VOC-017:** The workgroup concluded that the use of imaging technology as a tool for outreach and education is strongly suggested.

- **VOC-018:** This proposal will be included in the "Parking Lot" issues section of the workgroup report.

- A workgroup member suggested stating in the report that the NJDEP consider implementing any of the proposed control measures on a seasonal basis if it is more feasible.

- A workgroup member suggested that NJ should consider ways to encourage formulators to develop alternative product formulations that, on a reactivity adjusted basis, meet or exceed mass-based requirements.

Action Items/Person(s) responsible/Deadline:

3. All comments on these tracking items must be submitted by September 30, 2005 for inclusion in the workgroup report.

Topic 4: Further Discussion of Workgroup Report

Discussion:

- The purpose and goals of the workgroup report were explained to the workgroup
- The workgroup decided on a method to rank the recommendations.
- The workgroup was encouraged to submit language for use in the workgroup report to explain that not every workgroup member necessarily agrees with every recommendation in the workgroup report.
- The workgroup prioritized the proposals that were discussed as of September 7, 2005.

Action Items/Person(s) responsible/Deadline:

1. NJDEP will send a copy of the prioritized proposal list to the workgroup. The workgroup may comment on the list until September 30, 2005.

Wrap-up

- All information/proposals/comments/White Papers must be submitted by September 30, 2005. Please submit all items to airworkgroupvoc@dep.state.nj.us
- A follow-up meeting with participants from all workgroups will take place on November 14, 2005 at NJDEP headquarters in Trenton. Details will be sent at a later date.
- An air quality update workshop is tentatively scheduled for Spring 2006

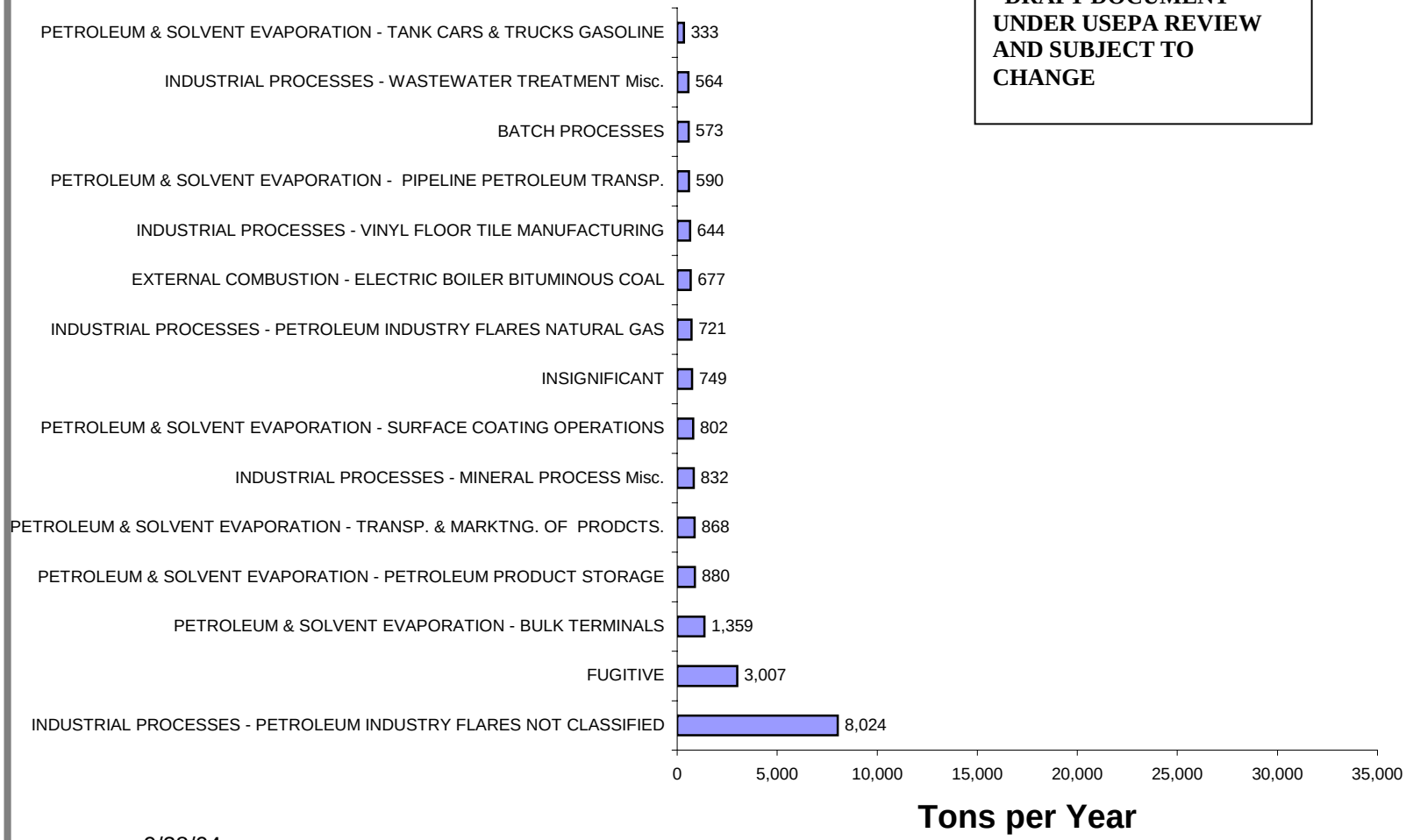
A Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared by the Volatile Organic Compounds from Processes and Consumer Products Workgroup

Appendix C: Data Reviewed by the Workgroup

October 31, 2005

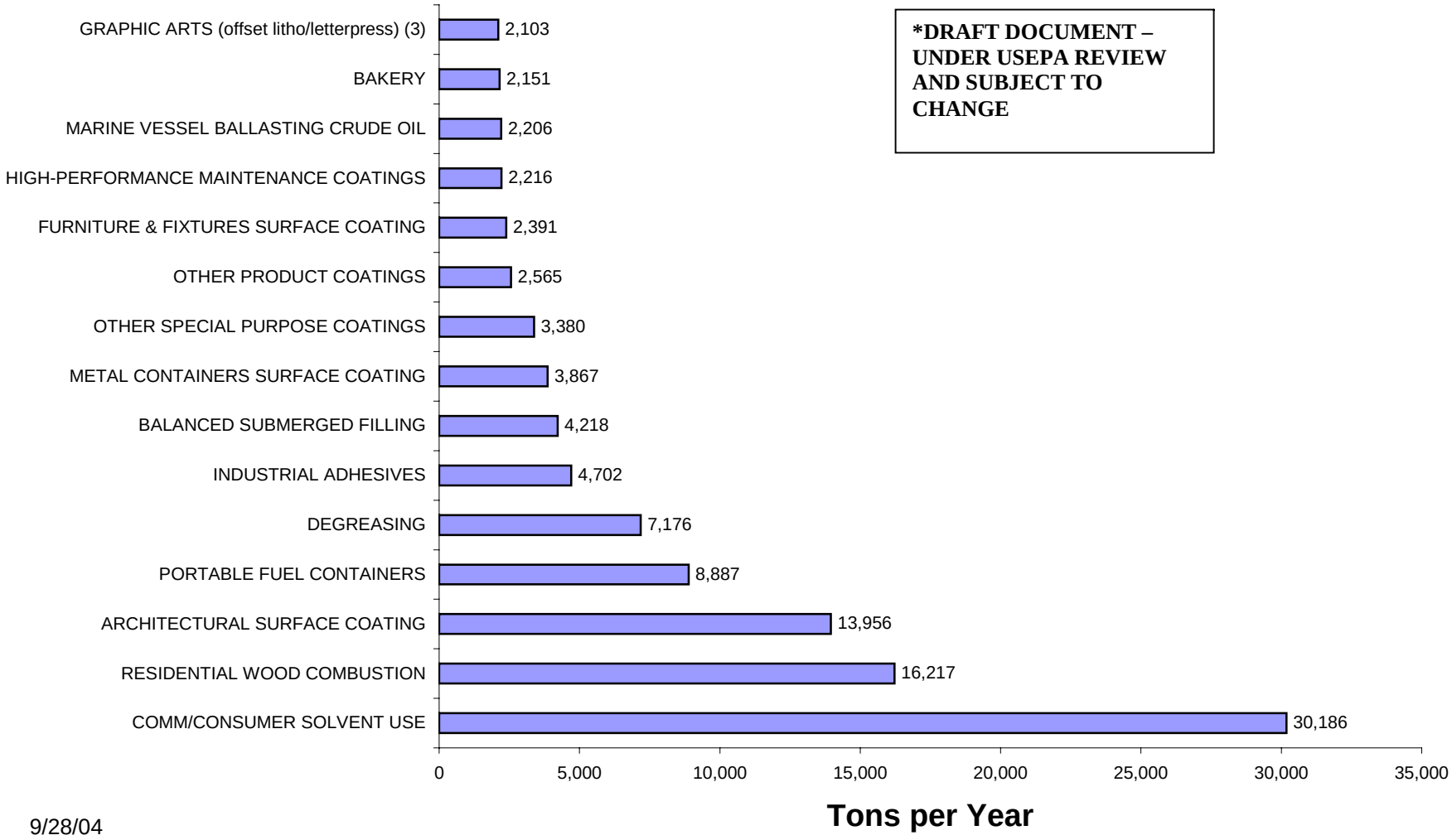
2002 New Jersey Point Source VOC Emission Inventory Top 15 by SCC



***DRAFT DOCUMENT – UNDER USEPA REVIEW AND SUBJECT TO CHANGE**

9/28/04

2002 New Jersey Area Source VOC Emission Inventory Top 15 by SCC



***DRAFT DOCUMENT – UNDER USEPA REVIEW AND SUBJECT TO CHANGE**

9/28/04

2002 Periodic Emission Inventory

Area Source VOC Emissions
Summer and Annual
Statewide

D R A F T

Eunc - emissions uncontrolled
Eunc - emissions controlled

		Summer VOC tpd		Annual VOC tpy	
SCC	**SOURCE CATEGORY**	**Eunc**	**Econ**	**Eunc**	**Econ**
2102001000	INDUSTRIAL ANTHRACITE COAL COMBUSTION	0.00	0.00	0	0
2102002000	INDUSTRIAL BITUMINOUS COAL COMBUSTION	0.00	0.00	0	0
2102004000	INDUSTRIAL DISTILLATE OIL COMBUSTION	0.01	0.01	3	3
2102005000	INDUSTRIAL RESIDUAL OIL COMBUSTION	0.00	0.00	0	0
2102006000	INDUSTRIAL NATURAL GAS COMBUSTION	0.00	0.00	0	0
2102007000	INDUSTRIAL LPG COMBUSTION	0.07	0.07	22	22
2102011000	INDUSTRIAL KEROSENE OIL COMBUSTION	0.00	0.00	0	0
2103001000	COMMERCIAL ANTHRACITE COAL COMBUSTION	0.00	0.00	0	0
2103002000	COMMERCIAL BITUMINOUS COAL COMBUSTION	0.00	0.00	0	0
2103004000	COMMERCIAL DISTILLATE OIL COMBUSTION	0.04	0.04	21	21
2103005000	COMMERCIAL RESIDUAL OIL COMBUSTION	0.01	0.01	7	7
2103006000	COMMERCIAL NATURAL GAS COMBUSTION	0.62	0.62	384	384
2103007000	COMMERCIAL LPG COMBUSTION	0.00	0.00	3	3
2103011000	COMMERCIAL KEROSENE OIL COMBUSTION	0.02	0.02	9	9
2104001000	RESIDENTIAL ANTHRACITE COAL COMBUSTION	0.00	0.00	0	0
2104004000	RESIDENTIAL DISTILLATE OIL COMBUSTION	0.18	0.18	146	146
2104006000	RESIDENTIAL NATURAL GAS COMBUSTION	0.50	0.50	605	605
2104007000	RESIDENTIAL LPG COMBUSTION	0.02	0.02	15	15
2104008000	RESIDENTIAL WOOD COMBUSTION	0.72	0.72	16,217	16,217

2104011000	RESIDENTIAL KEROSENE OIL COMBUSTION	0.01	0.01	5	5
2275900101	AIRCRAFT REFUELING -- AVIATION GASOLINE	0.05	0.05	17	17
2275900101	AIRCRAFT REFUELING -- JET KEROSENE	0.00	0.00	1	1
2302050000	BAKERY	5.91	5.91	2,151	2,151
2302070001	BREWERY	0.04	0.04	11	11
2302070005	WINERY	0.00	0.00	0	0
2302070010	DISTILLERY	0.07	0.07	17	17
2401001000	ARCHITECTURAL SURFACE COATING	56.27	50.61	15,516	13,956
2401005000	AUTO REFINISHING-equip cleaning	6.11	6.11	1,588	1,588
2401005000	AUTO REFINISHING-paint content	9.69	6.10	2,519	1,587
2401008000	TRAFFIC PAINTS	13.08	6.80	2,576	1,340
2401015000	FACTORY FINISHED WOOD SURFACE COATING	1.73	1.73	450	450
2401025000	FURNITURE & FIXTURES SURFACE COATING	14.26	9.20	3,708	2,391
2401040000	METAL CONTAINERS SURFACE COATING	14.87	14.87	3,867	3,867
2401050000	SHEET, STRIP, & COIL SURFACE COATING	9.59	5.14	2,495	1,337
2401055000	MACHINERY & EQUIPMENT SURFACE COATING	2.46	2.04	639	531
2401060000	APPLIANCES SURFACE COATING	0.29	0.29	75	75
2401065000	ELECTRICAL INSULATION SURFACE COATING	1.60	1.60	416	416
2401070000	NEW AUTOMOBILES SURFACE COATING	1.78	1.01	464	264
2401075000	OTHER TRANSPORTATION EQUIPMENT SURFACE COATING	0.24	0.24	63	63
2401080000	MARINE COATINGS	0.32	0.32	83	83
2401090000	OTHER PRODUCT COATINGS	9.86	9.86	2,565	2,565
2401100000	HIGH-PERFORMANCE MAINTENANCE COATINGS	17.36	11.25	3,419	2,216
2401200000	OTHER SPECIAL PURPOSE COATINGS	17.36	17.16	3,419	3,380
2415000000	DEGREASING	44.23	23.00	13,799	7,176
2420010055	DRY CLEANING --comm/indus	18.27	4.82	4,751	1,254
2425000000	GRAPHIC ARTS (offset litho/letterpress) (3)	8.09	8.09	2,103	2,103
2425000000	GRAPHIC ARTS (rotogravure/flexography) (3)	9.31	4.35	2,421	1,130

2440020000	INDUSTRIAL ADHESIVES	12.92	12.92	4,702	4,702
2461020000	PAVING ASPHALT APPLICATION	0.00	0.00	1	1
2461021000	CUTBACK ASPHALT APPLICATION	1.81	1.81	470	470
2461022000	EMULSIFIED ASPHALT APPLICATION	3.10	3.10	807	807
2461023000	ROOFING ASPHALT APPLICATION	0.98	0.98	254	254
2461800000	PESTICIDES APPLICATIONS -- AGRICULTURAL	3.54	3.54	838	838
2461800000	PESTICIDES APPLICATIONS -- GOLF COURSES	0.98	0.98	232	232
2461800000	PESTICIDES APPLICATIONS -- LAWNS	1.39	1.39	327	327
2461800000	PESTICIDES APPLICATIONS -- MOSQUITO	0.28	0.28	66	66
2461800000	PESTICIDES APPLICATIONS -- ROW	0.26	0.26	61	61
2465000000	COMM/CONSUMER SOLVENT USE	92.06	82.93	33,510	30,186
2501000120	PORTABLE FUEL CONTAINERS	24.42	24.42	8,887	8,887
2501060050	BALANCED SUBMERGED FILLING	48.29	13.52	15,066	4,218
2501060201	GASOLINE TANK BREATHING	5.12	5.12	1,982	1,982
2505020030	MARINE VESSEL BALLASTING CRUDE OIL	7.27	7.27	2,206	2,206
2505020030	MARINE VESSEL LOADING CRUDE OIL (4)	2.20	2.20	669	669
2505020030	MARINE VESSEL LOADING CRUDE OIL (4)	0.00	0.00	0	0
2505020030	MARINE VESSEL TRANSIT CRUDE OIL	2.77	2.77	495	721
2505020060	MARINE VESSEL LOADING RESIDUAL OIL (4)	0.00	0.00	0	0
2505020060	MARINE VESSEL LOADING RESIDUAL OIL (4)	0.00	0.00	0	0
2505020060	MARINE VESSEL TRANSIT RESIDUAL OIL	0.00	0.00	0	0
2505020090	MARINE VESSEL LOADING DISTILLATE OIL (4)	0.02	0.02	7	7
2505020090	MARINE VESSEL LOADING DISTILLATE OIL (4)	0.00	0.00	0	0
2505020090	MARINE VESSEL TRANSIT DISTILLATE OIL	0.00	0.00	0	0
2505020120	MARINE VESSEL BALLASTING GASOLINE	1.24	0.30	549	132
2505020120	MARINE VESSEL LOADING GASOLINE (4)	6.53	1.57	2,900	696

2505020120	MARINE VESSEL LOADING GASOLINE (4)	0.00	0.00	0	0
2505020120	MARINE VESSEL TRANSIT GASOLINE	0.59	0.59	240	240
2505020150	MARINE VESSEL LOADING JET FUEL (4)	0.24	0.24	73	73
2505020150	MARINE VESSEL LOADING JET FUEL (4)	0.00	0.00	0	0
2505020150	MARINE VESSEL TRANSIT JET FUEL	0.05	0.05	9	13
2505020180	MARINE VESSEL LOADING KEROSENE (4)	0.00	0.00	0	0
2505020180	MARINE VESSEL LOADING KEROSENE (4)	0.00	0.00	0	0
2505020180	MARINE VESSEL TRANSIT KEROSENE	0.00	0.00	0	0
2505030120	GASOLINE TRANSIT BY RAIL TANK CAR &TRUCK	0.48	0.13	149	42
2601000000	ON-SITE INCINERATION -- INDUSTRIAL (4)	0.20	0.20	71	71
2601000000	ON-SITE INCINERATION -- INDUSTRIAL (4)	0.00	0.00	0	0
2601000000	ON-SITE INCINERATION -- MUNICIPAL (Apt or solid waste)(4)	0.05	0.05	17	17
2601000000	ON-SITE INCINERATION -- MUNICIPAL (Apt or solid waste)(4)	0.00	0.00	0	0
2601000000	ON-SITE INCINERATION -- PATHOLOGICAL	0.00	0.00	2	2
2601000000	ON-SITE INCINERATION -- SLUDGE	0.02	0.02	7	7
2610000100	OPEN BURNING Residential Leaf	0.00	0.00	122	15
2610000400	OPEN BURNING Residential Brush	0.05	0.00	83	3
2610030000	OPEN BURNING Residential Municipal Solid Waste	0.38	0.01	140	4
2610040400	OPEN BURNING Municipal Yard Waste	0.00	0.00	0	0
2620000000	LANDFILLS	1.50	1.50	547	547
2630010000	INDUSTRIAL TREATMENT WORKS	0.02	0.02	7	7
2630020000	PUBLICLY OWNED TREATMENT WORKS	0.02	0.02	6	6
2660000000	LEAKING UNDERGROUND STORAGE TANK	0.04	0.04	15	15
2801500000	AGRICULTURAL FIELD BURNING of agricultural land clearing matter	0.25	0.25	131	131
2801500000	AGRICULTURAL FIELD BURNING of herbacous agricultural matter	0.01	0.01	7	7

2801500000		AGRICULTURAL FIELD BURNING of infested agricultural matter	0.01	0.01	5	5
2801500000		AGRICULTURAL FIELD BURNING of orchards	0.14	0.14	92	92
2810001000		WILDFIRE	7.09	7.09	779	779
2810015000		MANAGED BURNING	0.00	0.00	276	276
2302002200		RESTAURANT OPERATIONS	0.91	0.91	333	333
2810030000		STRUCTURAL FIRE	0.19	0.19	88	88
2810050000		VEHICLE FIRES	0.05	0.05	19	19
2810003000		CIGARETTE SMOKING	0.00	0.00	0	0
State total			**492.53**	**369.79**	**163,813**	**127,658**

Area Sources Calculation Methodology Sheets for the 2002 Periodic Emission Inventory

Graphic Arts (Offset lithography/letterpress)
SCC: 2425000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Surveying individual graphic arts facilities
2. Population based analysis

The population based analysis/methodology is selected because the input data elements are more readily available.

Emissions from graphic arts operations are calculated using county level population.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. County Population, CPOP [2]
2. Percentage of population representative of offset lithography/letterpress operations,
   PERPOP = 28 + 18 = 46 % [3]
3. Emission Factors, EF, (lbs/person/year) [4]
   VOC= 1.3
4. Weekly activity, WAF=5 days/week [5]
5. Seasonal adjustment factor, SAF=1 [5]

Process:
The following equations are used to calculate the emissions without control efficiency for this source category.

Ep_a = CPOP*PERPOP*EF/CF
Ep_s = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All solvent consumed is emitted; no accounting for waste solvent recycling and disposal
2. The 46.0 % of population that utilizes offset lithography/letterpress within the graphic arts inventory is presumed to be valid.

Rule Effectiveness:
The emissions from this source category are regulated by the following rule: None

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

$Ep_{adj} = Ep_a - PT$

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Point source emissions (tons/yr) [6]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone Vol I: General Guidance for Stationary Sources, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016, May 1991

2. Estimate of 2002 Total Resident Population by County, NJDOT, July 17, 2003.

3. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.9.1.2, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 7 - Graphic Arts, November 18, 1996, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

6. NJ Point Source Emission Inventory for 2002, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2002 Periodic Emission Inventory

Graphic Arts (rotogravure/flexography)
SCC: 2425000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Surveying individual graphic arts facilities
2. Population based analysis

The population based analysis/methodology is selected because the input data elements are more readily available.

Emissions from graphic arts operations are calculated using county level population.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. County Population, CPOP [2]
2. Percentage of population representative of rotogravure/flexography operations,
   PERPOP = 41 + 13 = 54 % [3]
3. Emission Factors, EF, (lbs/person/year) [4]
   VOC= 1.3
4. Control Efficiencies, CE

The following equations are used to calculate the control efficiency for this source category:

STEP ONE: Establish voc content (lbs/gal) prior to rule implementation
$\text{voc content}_{\text{no rule}}$ = 75 % by volume for both rotogravure [5] and flexography [6]

STEP TWO: Establish rule voc content
$\text{voc content}_{\text{rule}}$ = 25 % lbs/gal [7]

STEP THREE: Calculate CE
CE = ($\text{voc content}_{\text{no rule}}$ - $\text{voc content}_{\text{rule}}$)/($\text{voc content}_{\text{no rule}}$)
CE = (75 - 25)/(75) * 100 %
CE = 66.67 %

5. Rule Effectiveness, RE = 80 % [1]
6. Rule Penetration, RP = 100 %
7. Weekly activity, WAF=6 days/week [8]
8. Seasonal adjustment factor, SAF=1 [8]

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = CPOP*PERPOP*EF*(1 - (CE*RE*RP))/CF
Ep_s = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton

AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. All solvent consumed is emitted; no accounting for waste solvent recycling and disposal.
2. The 54.0 % of population that utilizes rotogravure and flexography operations within the graphic arts inventory is presumed to be valid.
3. Assume that the 75 % by volume voc content for rotogravure and flexography operations corresponds to 0.75 lb/gal.
4. Assume that voc content limitation of 25 % for graphic arts source operation required by the rule cited by
reference 7, applies to all rotogravure and flexography operations conducted in New Jersey.
5. Assume a rule penetration factor of 100 %.

Rule Effectiveness:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, 7:27-16.7(4), Surface Coating and Graphic Arts Operations, Table 7D Graphic Arts Operations, Part B, Control Criteria for Graphic Arts Source Operations Except Screen Printing Operations, December 31, 1981 and December 31, 1987 and May 31, 1995

Double Counting:
Emissions for this source category have also been reported in the point source inventory. The following methodology is used to adjust the area source emissions for this category to remove the emissions already accounted for in the point source inventory.

$$Ep_{adj} = Ep_a - PT$$

Where:
Ep_{adj} = (tons/yr) for an annual emission of pollutant by county excluding double counting
PT = Point source emissions (tons/yr) [9]

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone Vol I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. Estimate of 2002 Total Resident Population by County, NJDOT, July 17, 2003.

3. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.9.1.2, page 4.9.1-6, , United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 7 - Graphic Arts, November 18, 1996, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

5. Compilation of Air Pollutant Emission Factors, AP-42 Fifth Edition, Section 4.9.1.1.3 , page 4.9.1-3

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 7 - Graphic Arts, Section 2.2 Flexographic Printing, page 7.2-7

7. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, 7:27-16.7(4), Surface Coating and Graphic Arts Operations, Table 7D Graphic Arts Operations, Part B, Control Criteria for Graphic Arts Source Operations Except Screen Printing Operations, December 31, 1981 and December 31, 1987 and May 31, 1995

8. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

9. NJ Point Source Emission Inventory for 2002, New Jersey Department of Environmental Protection

Area Sources Calculation Methodology Sheets for the 2002 Periodic Emission Inventory

Consumer Products
SCC: 2465000000

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual households
2. Population based analysis

The population based analysis is selected because the input data elements are more readily available.

Emissions from consumer products are calculated using county level population.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. County population, CPOP [2]
2. Emission factor, EF, (lbs/capita/year)
   VOC = 7.84 lbs/capita [3]
3. Control Efficiency, CE

STEP ONE: NJ Consumer Product Rule Emission Reduction Benefit (lbs/capita/year):
ERNJ = 0.75 lbs/capita/year [4]

STEP TWO: Additional Emission Reduction Benefit from National rule limits for windshield washer fluids and charcoal lighter fluids, categories which are not in the NJ rule.

ERNAT = 0.22 lbs/capita/year [5]

STEP THREE: Determine new EF after application of NJ and National Consumer Product Rules

EF_{rule} = (EF - ERNJ - ERNAT)
= (7.84 - 0.75 – 0.22)
= 6.87 lbs/capita/year

STEP FOUR: Calculate CE
$CE = (EF_{no\ rule} - EF_{rule})/(EF_{no\ rule})$
CE = (7.84 –6.87)/(7.84) * 100 %
CE = 12.4 %

4. Rule Effectiveness, RE; RE = 80 % [1]
5. Rule Penetration, RP; RP = 100 %
5. Weekly activity, WAF=7 days/week [6]
7. Seasonal adjustment factor, SAF=1 [6]

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = CPOP*EF*(1 - (CE*RE*RP))/CF
Ep_s = Ep_a*SAF/AADF

Where:

Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Rule Effectiveness:
The emissions from this source category are regulated by the following rules:
1. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 24, New Jersey StateDepartment of Environmental Protection, November 6, 1995
2. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products, CFR 40, Chapter 1, Subchapter C, Part 59, Subpart C-National Volatile Organic Compound Emission Standards for Consumer Products

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. Estimate of 2002 Total Resident Population by County, NJDOT, July 17, 2003.

3. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 5 - Consumer and Commercial Solvent Use, August 2, 1996, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

4. State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standards, Meeting the Requirements of the Alternative Ozone Attainment Demonstration Policy, Appendix V: Rate-of-Progress Plan Benefits Calculations, Section XX, New Jersey's Consumer Products Rule, page 24, The State of New Jersey, Department of Environment Protection, December 31, 1996

5. EPA Report to Congress: Study of Volatile Organic Compound Emissions From Consumer and Commercial Products, March 1995, Table 2-3.

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2002 Periodic Emission Inventory

Gasoline Handling & Marketing, Tank Breathing
SCC: 2501060201

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Surveying individual gasoline service stations
2. Gasoline throughput analysis

The gasoline throughput analysis is selected because the input data elements are more readily available.

Emissions from gasoline tank breathing are calculated using statewide gasoline consumption, allocated to the county level using vehicle miles travelled.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.

1. NJ gasoline consumption, GAS (10^3 gallons) [2]
2. State and County Vehicle Miles Travelled, SVMT, CVMT [3]
3. Emission factor, EF, (lbs/10^3 gallons) [4]
   VOC=1.0
4. Weekly activity, WAF=7 days/week [5]
5. Seasonal adjustment factor, SAF=1 [5]

Process:
The following equations are used to calculate the emissions without control for this source category.

Ep_a = GAS*EF*(CVMT/SVMT)/CF
Ep_s = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Assume seasonal adjustment factor of 1.

Rule Effectiveness:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16, New Jersey State Department of Environmental Protection, May 15, 2000

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:

The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day

References:

1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. State Energy Data 2000 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. New Jersey Department of Environmental Protection 2002 Mobile Inventory

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 11 – Gasoline Marketing (Stage I and Stage II), Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

5. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2002 Periodic Emission Inventory

Gasoline Handling & Marketing, Transport by Rail Tank Car and Truck
SCC: 2505030120

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category: [1]

1. Surveying the transport industry
2. Gasoline throughput analysis

The gasoline throughput analysis is selected because the input data elements are more readily available.

Emissions from gasoline tank truck and rail car transport are calculated using statewide gasoline consumption, allocated to the county level using vehicle miles travelled.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. New Jersey gasoline consumption, GAS (10^3 gallons) [2]
2. State and County Daily Vehicle Miles Travelled, SVMT, CVMT [3]
3. A gasoline transportation adjustment factor (GTAF) of 1.25 is applied to account for gasoline resale [4]
4. Emission factor, EF, (lbs/10^3 gallons) [4]
   VOC=0.06
5. Control Efficiencies, CE
   $CE_{procedures}$ = 90.0 % [5]
6. Rule Effectiveness, RE; RE = 80 % [1]
7. Rule Penetration, RP = 100 %
8. Weekly activity, WAF=6 days/week [6]
9. Seasonal adjustment factor, SAF=1

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = 1.25*GAS*(CVMT/SVMT)*EF*(1- (CE*RE*RP))/CF
Ep_s = Ep_a/AADF*SAF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
2. Railcar and truck transport were incorporated into one category because NJDEP was unable to distingusih the amount of gasoline carried by each.
3. All gasoline transported to individual facilities are either taken by truck or railcar.
4. Assume a seasonal adjustment factor of 1
5. Assume a rule penetration factor of 1

Rule Effectiveness:
The emissions from this source category are regulated by the following rule:

New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16, New Jersey State Department of Environmental Protection, May 15, 2000

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. State Energy Data 2000 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. New Jersey Department of Environmental Protection 2002 Mobile Inventory

4. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 11 – Gasoline Marketing (Stage I and Stage II), Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

5. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16, New Jersey State Department of Environmental Protection, May 15, 2000

6. EIIP Volume III, Chapter 1, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c

Area Sources Calculation Methodology Sheets for the 2002 Periodic Emission Inventory

Gasoline Handling & Marketing, Tank Truck Unloading Loss (Balanced Submerged Filling or Stage I)
SCC: 2501060050

The following describes the emission calculation methodology for this source category for the following pollutants: volatile organic compounds (VOC). The emissions are calculated on an annual basis and for a typical summer and winter day for each county and statewide. Superscripts refer to references listed at the end of each calculation methodology sheet.

Calculation Methodology:
The following calculation methodologies are recommended for this source category:[1]

1. Surveying individual gasoline service stations
2. Gasoline throughput analysis

The gasoline throughput analysis is selected because the input data elements are more readily available.

Emissions from gasoline tank truck unloading are calculated using statewide gasoline consumption, allocated to the county level using vehicle miles travelled.

Required Input Parameters:
The following input data is required to calculate emissions for this source category.
1. NJ gasoline consumption, GAS (10^3 gallons) [2]
2. State and County Daily Vehicle Miles Travelled, SVMT, CVMT [3]
3. Emission factor, EF, (lbs/10^3 gallons) [4]
   VOC=7.6
3. Control Efficiencies, CE = 90% [5]
4. Rule Effectiveness, RE = 80 % [1]
5. Rule Penetration, RP = 100 %
4. Weekly activity, WAF=6 days/week [6]
5. Seasonal adjustment factor, SAF=1

Process:
The following equations are used to calculate the emissions with control for this source category.

Ep_a = GAS*EF*(CVMT/SVMT) *(1- (CE*RE*RP)/CF
Ep_s = Ep_a*SAF/AADF

Where:
Ep_a = (tons/yr) for an annual emission of pollutant by county
Ep_s = (tons/day) for a typical summer day emission of pollutant
CF = Conversion factor for units = 2000 lbs/ton
AADF = Annual activity day factor (WAF * 52 weeks/year)
SAF = Seasonal adjustment factor

Assumptions:
1. Assume seasonal adjustment factor of 1

Rule Effectiveness:
The emissions from this source category are regulated by the following rule:
New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16.3, New Jersey State Department of Environmental Protection, May 15, 2000

Double Counting:
Emissions for this source category have not been reported in the point source inventory, therefore no adjustment of the area source emissions was required.

Output:
The emissions will be calculated on a county and statewide basis for the following pollutants and seasons:

Pollutant	Annual	Summer day	Winter day
VOC	tons/yr	tons/day	tons/day

References:
1. Procedures for the Preparation of Emission Inventories for Carbon Monoxideand Precursors of Ozone, Vol. I: General Guidance for Stationary Sources, May 1991, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-91-016

2. State Energy Data 2000 Consumption Tables (formerly the State Energy Data Report), United States Department of Energy, Energy Information Administration, Office of Energy Markets and End Use, Washington, DC

3. New Jersey Department of Environmental Protection 2002 Mobile Inventory

4. CARB Uncontrolled Vapor Emission Factor at Gasoline Dispensing Facilities, January 5, 2000

5. New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 16, N.J.A.C. 7:27-16.3, New Jersey State Department of Environmental Protection, May 15, 2000

6. EIIP Volume III, Area Sources Preferred and Alternative Methods, Chapter 1 - Introduction, Emission Inventory Improvement Program, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-454/R-97-004c4.

Successfully Creating a Reactivity-Based Program for Control of VOCs in Consumer Products and Coatings

American Solvents Council of the American Chemistry Council

Overview

- Concept of relative photochemical reactivity
- Limitations of mass-based programs in regulating formulated products
- Potential benefits of reactivity-based programs
- California's aerosol coatings Rule: The reactivity-based approach in action
- Conclusion

What is Photochemical Reactivity?

Photochemical reactivity is a measure of the potential of a given compound to contribute to ozone levels in the troposphere (lower atmosphere).

What is Relative Photochemical Reactivity?

- Some VOCs have greater impact on ozone levels than others. For example:
  - A gram of VOC “A” → less than 0.1 gram of ozone
  - A gram of VOC “B” →more than 10 grams of ozone

  While the mass of both VOCs are equal, VOC “B” contributes 100 times more to ozone accumulation.

- *Relative photochemical reactivity* measures on a common scale the change in the amount of ozone in the atmosphere as a result of an incremental change in amount of a given VOC (usually expressed in grams of ozone per gram of VOC).

Focus of This Presentation

This presentation explores mass-based approaches and considers how reactivity-based approaches might be used to improve the regulation of VOCs.

What the Presentation will Demonstrate

- In many instances, relative reactivity can be used to improve regulatory strategies:
  - Can yield greater environmental benefits by encouraging use of lower reactivity ingredients.
  - Can impose less burden and cost on product manufacturers and the public.
  - Will make possible the effective measurement and regulation of VOC reactivity with available scientific technologies.

Limits of Mass-Based Programs for Regulating Formulated Products

- Do not consider each VOC's relative potential to contribute to the accumulation of ozone.
- Treat all non-exempt VOC emissions alike, although their potential contributions to the accumulation of ozone vary greatly.
- Can result in performance problems if VOC content is "squeezed" too hard.
- If a coating has to be applied more often, or if a cleaner has to be used in greater quantities, the benefits of new formulations are reduced – more likely to be an issue with mass-based programs.

Mass-Based Programs Can Lead to Use of More Highly Reactive VOCs

- Tighter mass-based limits may cause formulators to use solvents that are more effective but also more photochemically reactive.
- This happened in California, and was one reason CARB adopted a relative reactivity approach for its aerosol coatings regulation.
- The end result of a mass-based limit may be that ozone impact actually increases.

Theoretical Reformulation Example

- Two formulations with similar VOC content can have very different ozone creation potentials.
- The alternative formulation in this example results in a 63% reduction in theoretical ozone generation:

Acrylic Resin Top Coat for Industrial Maintenance Formulation by %[1]

Component	Control	Alternative
MEK	25	
Xylene	40	
PM Acetate	10	
Butyl Acetate	25	53
Ethyl Acetate		15
Methyl Propyl Ketone		23
Amyl Acetate		9
Environmental Impact		
VOC, g/L Solvent	216	214
MIR, g Ozone/g VOC	3.68	1.36
Ozone Created, grams	795	291

1. Pigment/Binder Ratio = 0.5
   Resin = 50%, Pigment = 25%, Solvent = 25%

Another Theoretical Reformulation Example

- Here, a 22 % reduction in mass nevertheless yields ***almost double*** the reactivity:

Alkyd Top Coat for Industrial Maintenance Formulation by %[1]

Component	Resin #1, 40% Total Solids [2]	Resin #2, 60% Total Solids [3]
Regular Mineral Spirits	100	
C9 Aromatic		28
EEP		72
Environmental Impact		
VOC, g/L Solvent	474	370
MIR, g Ozone/g VOC	1.82	4.70
Ozone Created, grams	863	1741

1. Pigment/Binder Ratio = 0.5
2. Resin = 27%, Pigment = 13%, Solvent = 60%
3. Resin = 40%, Pigment = 20%, Solvent = 40%

Mass-Based Approaches Provide No Incentive for Use of Less Reactive VOCs

- VOCs with “high” relative reactivity are treated the same as VOCs with “low” reactivity (provided they are not exempt).

- Companies have no incentive to switch from highly-reactive compounds to compounds with low reactivity.

Mass-Based Approaches May Not Result in Optimal Air Protection

- Mass-based approaches give equal ‘credit’ for emissions reductions that do not provide equal benefits.
- Actual environmental impact depends on which VOC is reduced or eliminated, and if a new VOC is introduced, how its relative reactivity compares to that of what has been replaced.
- The result is that we often don’t really know how much the regulation accomplishes and if true “reasonable further progress” is being made.

Reactivity-Based Regulation

- Individual compounds are assessed on a more accurate indicator of potential ozone-level impact.
- Similar compounds are not treated differently (*i.e.*, currently compounds with slightly higher reactivity are not exempt while those with slightly lower reactivity than ethane are exempt).
- Vastly different compounds (very high reactivity vs. relatively low reactivity) are no longer treated alike.

Reactivity-Based Regulation

- Regulators can predict the effect of new requirements more accurately, based on a more accurate indicator of each compound's potential impact on ozone levels.

- Regulators will have greater confidence that the potential ozone-impact of a product formulation has actually been reduced.

- Product formulators have an incentive to develop new formulations by substituting less reactive VOCs for more highly reactive VOCs.

- Reactivity-based approaches allow for prioritization among product categories and for direction of research towards emissions with the greatest potential ozone impacts.

Genesis of California's Reactivity-Based Regulation

- As far back as the mid-1960s, California regulated on the basis of reactivity, particularly in the Los Angeles area (known as the 66/3 rules).
- In 1991, California took into account VOC reactivity in part of a regulation intended to reduce VOC emissions by mass from motor vehicles.
- In 1995, California's Air Resources Board (CARB) adopted statewide regulation limiting the VOC mass content of 35 categories of aerosol coatings.
- By 2000, CARB sought to reduce VOC emissions further by instituting relative reactivity limits.

The California Aerosol Coatings Rule

- In 2000, as part of California's SIP for ozone under the federal CAA, CARB first sought to switch the baseline by which it measures acceptable limits of VOCs in aerosol coatings from weight to relative photochemical reactivity.
- In part, CARB adopted the Rule on the basis that manufacturers, under the mass-based approach, were switching from higher masses of VOCs with low reactivity to lower masses of VOCs with higher reactivity – a counterproductive effect.
- CARB sent the Rule to the EPA for approval in 2002.
- The EPA proposed in January 2005 the approval of CARB's regulation.

Applicability

- The California Rule applies to:
  - Aerosol coatings
  - Aerosol clear coatings
  - Aerosol stains
  - Any person who sells, supplies, offers for sale, applies or manufactures for use in CA any of these aerosol coatings

Defining VOCs

- CARB's Aerosol Coatings Rule includes all compounds that have the potential, once emitted, to contribute to ozone formation in the troposphere.

- Even those VOCs exempted by the EPA under federal law are included.

- *Terminology Note*: Under the Rule, CARB defines this broadened set of VOCs as "Reactive Organic Compounds" (ROCs).

Defining Maximum Incremental Reactivity

- CARB chose the MIR as the standard for photochemical reactivity.

- The MIR is the maximum change in weight of ozone formed by adding a compound to the “Base ROG Mixture” (a controlled mix of reactive organic gases used to derive the MIR scale), per weight of compound added, expressed to hundredths of a gram.

Reliability of the MIR Standard

- The MIR scale is designed on the basis of certain assumptions about meteorological and environmental conditions where ozone is most sensitive to changes in hydrocarbon emissions.
- MIR scale may not be perfectly suited for all geographic areas.
- CARB will review the tables of MIR values every 18 months to determine if modifications are warranted.

Mechanics of §94522(a)(3) of CARB's Aerosol Coatings Rule

- The Rule provides a table of limits for both general coatings and specialty coatings.
- The new limits list each aerosol coating category with an appropriate product-weighted MIR (the sum of all weighted-MIR for all ingredients in a covered coating) in grams of ozone per gram of product (g O_3 / g product).
- For example, metallic coatings in general may not exceed 1.90 g O_3 / g product. Auto body primers may not exceed 1.55 g O_3 / g product.

Hydrocarbon Solvents Bins (§94701)

- Classifies complex hydrocarbon solvents into 24 bins
- 20 bins for aliphatic solvents, based on:
  - Boiling range,
  - Aromatic content (<2%, 2-<8%, 8-22%),
  - Aliphatic isomer content (= 90% n- and iso- or cyclo)
- 4 bins for aromatic solvents (=98%) based on boiling range.
- Individual hydrocarbons (e.g. toluene) not binned.

Outright Prohibitions

- CARB's Aerosol Coatings Rule prohibits the use of products containing several toxic air contaminants (§94522(c)(2)(a)):
  - Methylene Chloride
  - Trichloroethylene
  - Perchloroethylene
  - Stratospheric Ozone-Depleting Substances (as identified by the EPA in 40 CFR Part 82, Subpart A).

Labeling Requirements

- Apply to both manufacturers and responsible party for each aerosol coating product (§94524(b)(1)).
- Must include:
  - Applicable reactivity limit for each product
  - Aerosol coating category (or an abbreviation)
  - Day, month and year in which the product was manufactured.
- Information must be readily observable without removing or disassembling the product or packaging.

Reporting Requirements

- Responsible parties must report to CARB within 90 days:
  - Company name
  - Mail address
  - Contact person and telephone number
  - The above information of the manufacturer (if the responsible party did not also manufacture the covering)
- Upon 90 days written notice, each manufacturer or responsible party must report:
  - Product's brand name
  - A copy of the product label
  - Owner of trademark and brand names
  - Product category as defined in §94521
  - Annual CA sales in pounds per year and the method used to calculate sales
  - Product formulation data
  - Identification as "household," "industrial," or "both"

Variance Provisions

- CARB allows parties to apply in writing for a variance from the Rule, but only upon the following conditions:
  - Requiring compliance would result in extraordinary economic hardship because of reasons beyond the reasonable control of the applicant.
  - The public interest in mitigating the extraordinary hardship to the applicant outweighs the interest in avoiding any increased emissions of air contaminants which would result from issuing the variance.
  - The compliance report proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

Compliance and Testing

- §94526 provides that compliance with the Rule will be determined by using CARB Method 310.
- Only those components with concentration equal to or greater than 0.1 percent will be reported.
- Impurities (chemicals present in a raw material that are incorporated into formulation) can be present only at very small levels – less than 0.1 percent (by weight) for carcinogens and less than 1 percent for all other compounds.

Benefits of CARB's Aerosol Coatings Rule

- CARB estimates the new Aerosol Coatings Rule will result in greater air quality benefit than the mass-based approach.
- By shifting to a reactivity-based system, the Rule encourages manufacturers to shift to solvent formulations with relatively less reactive VOCs.
- By including previously exempted VOCs, coatings limits will be more precise.

Confidential Business Information and Record-Keeping Issues

- The Aerosol Coatings rule will require manufacturers to list publicly the specific proportions of each VOC.

- Manufacturers will not be required, however, to list non-reactive components of their coatings (*e.g.*, solids and resins).

EPA Approval

- The EPA proposed approval of CARB's Aerosol Coverings Rule in January 2005.

- The EPA also proposed revising its definition of VOCs so that previously-exempt compounds (*i.e.*, those with less reactivity than ethane) will now count toward the product's reactivity-based VOC limit for the purpose of CARB's Rule (exemption still applies for all other purposes).

Conclusion

- In many formulated applications, mass-based approaches to VOC regulation are limited in their ability to sharply target and reduce ground-level ozone.
- Reactivity-based approaches provide a more nuanced and refined means of reducing ozone levels.
- California's Aerosol Coatings Rule demonstrates the applicability and efficacy of reactivity-based approaches.

American Solvents Council Members

- Dow Chemical Company
- ExxonMobil Chemical Company
- Shell Chemical LP
- Eastman Chemical Company
- Sasol North America, Incorporated
- Lyondell Chemical Company
- CITGO Petroleum Corporation

Since when
can cleaning the air
save you money?

Since the

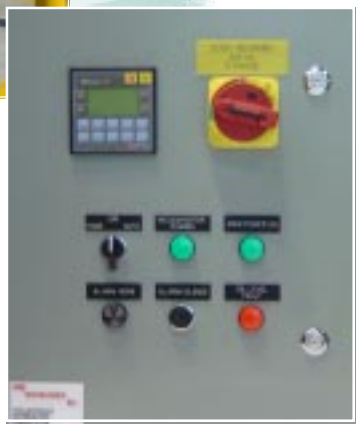
PERMEATOR™

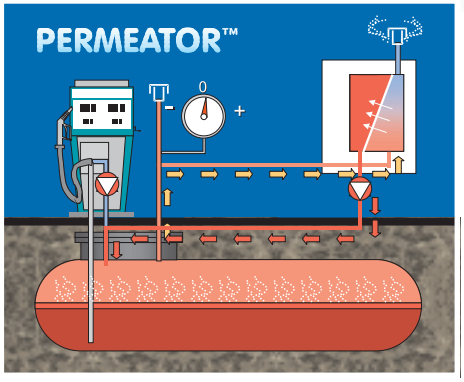
ARID TECHNOLOGIES, INC.

130 N. LaGrange Road • LaGrange, IL 60525
708.354.1100 • Fax 708.354.4995 www.ARIDtech.com

The *PERMEATOR*™

- ***Saves* You Money by Reducing Gasoline Evaporative Losses**
- **Keeps the *Environment Cleaner***
- **Independent, third-party field test confirmed the predicted evaporative losses and determined that the PERMEATOR reduced these evaporative emissions by 99.27%.**
- **Protects the Health of Your Staff and Customers**
- **Installs Easily into Stage II Vapor Recovery Systems or Stands Alone at Uncontrolled Sites**
- **UL698A Approved**





The ***PERMEATOR*** prevents the venting of gasoline vapors (volatile organic compounds) and resulting product loss from gasoline storage tanks through a patented membrane. The system virtually eliminates evaporative emissions and has been proven over many years in large tank storage and refinery applications.

Arid Technologies, Inc., now brings this same robust technology to the ***retail station environment.***

Design Highlights

The ***PERMEATOR*** reduces the evaporative emissions of gasoline vapors by over 99%, while it simultaneously increases salable gasoline product volume by up to 0.5% of gasoline sold (5 gallons per 1,000 gallons dispensed). The ***PERMEATOR*** handles the 500-1 volume increase that occurs when gasoline evaporates by using the patented membrane system.

The ***PERMEATOR*** can be installed without excavation and is simple to maintain.

The compact unit can be retrofitted to existing Stage II vapor recovery systems (vacuum-assisted or balance) or installed at facilities with no recovery systems.

For Stage II systems, the ***PERMEATOR*** allows for improved refueling vapor recovery efficiency at the nozzle without sacrificing evaporative emissions from the storage tanks.

As on-board refueling vapor recovery (ORVR) equipped vehicles continue to enter the nation's fleet, the ***PERMEATOR*** will bring increasing economic return to gasoline marketers while delivering greater environmental benefits.

Feature	Benefits
Low initial cost. Less than 1-2% of typical outlet construction costs. Similar cost as new Multiple product dispenser (MPD).	High return on investment (15-95%) and short pay back period depending on site-specific factors.
1.High hydrocarbon vapor recovery efficiency (>99%) without wasting natural resources or generating secondary air pollution. 2. Allows vacuum-assisted systems to operate with higher (V/L) ratios and to achieve higher collection efficiencies at nozzle/ automobile interfaces.	Environmentally Friendly technology exceeds current federal, state, and local emission requirements. Provides consumer and environmental protection, while at the same time recovering salable product.
Retrofits both uncontrolled and Stage II compliant refueling facilities.	Can be installed in any existing refueling facility: 1. Allows uncontrolled dispensing facilities to avoid large evaporative losses as storage tanks ingest air from vent lines. 2. Allows dispensing facilities using balance or vacuum assisted systems to avoid large evaporative losses as the ORVR vehicle population increases.
Unique membrane technology selectively recovers toxic compounds, such as benzene, toluene and MTBE.	Membrane vapor recovery eliminates evaporative losses of VOC's and hazardous air pollutants (HAP's) by converting them into usable products.
Elegant, compact, durable design.	Easy installation with little or no excavation.
Safe solution for variable vapor concentrations generated by ORVR equipment on new cars.	Eliminates the potential for increased vapor emissions as the population of ORVR vehicles dramatically increases over the next 10 years.
1. Simple operation since membrane module has no moving parts. Expected life cycle of membrane is 15-20 years with minimal maintenance cost. 2. Warranty: three year parts and labor 3. Energy efficient — no phase changes are involved in the separation because all streams enter and exit the system in the vapor phase.	Very low operating costs. $25-$60/month Reduces MTBE contamination in ground water by lowering the fugitive underground vapor emissions

ARID TECHNOLOGIES, INC.
130 N. LaGrange Road • LaGrange, IL 60525
708.354.1100 • Fax 708.354.4995
www.ARIDtech.com

Respondent's Obligation: Voluntary.

Written comments and recommendations on the proposed information collection should be sent to the TRICARE Management Activity, Attn: Col Gary Martin, 5111 Leesburg Pike, Suite 810, Falls Church, VA 22041–3206 (703–681–0039). Comments should be received within 60 days of publication of this notice.

To request more information on this proposed information collection or to obtain a copy of the proposed and associated collection instruments, please write to TRICARE Management Activity, Attn: Col Gary Martin, 5111 Leesburg Pike, Suite 810, Falls Church, VA 22041–3206, or telephone Col Martin at 703–681–0039.

List of Subjects in 32 CFR Part 199

Claims, Dental health, Health care, Health insurance, Individuals with disabilities, Military personnel.

For the reasons set out in the preamble, 32 CFR part 199 is proposed to be amended as follows:

PART 199—[AMENDED]

1. The authority citation for Part 199 continues to read as follows:

Authority: 5 U.S.C. 301; 10 U.S.C. Chapter 55.

2. Section 199.13(g)(2)(ii) is proposed to be revised to read as follows:

§ 199.13 TRICARE Dental Program.

* * * * *

(g) * * *

(2) * * *

(ii) Participating providers shall be reimbursed in accordance with the contractor's network agreements, less any cost-share amount due for authorized services.

* * * * *

Dated: August 25, 2005.

Jeannette Owings-Ballard,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 05–17299 Filed 8–30–05; 8:45 am]

BILLING CODE 5001–06–M

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 51

[OAR–2005–0148; FRL–7963–1]

Advance Notice To Solicit Comments, Data and Information for Determining the Emissions Reductions Achieved in Ozone Nonattainment and Maintenance Areas From the Implementation of Rules Limiting the VOC Content of AIM Coatings

AGENCY: Environmental Protection Agency (EPA).

ACTION: Advance notice of proposed rulemaking.

SUMMARY: By this action, EPA is soliciting comments, data and information for determining how to calculate the reductions in volatile organic compounds (VOC) emissions achieved in ozone nonattainment and maintenance areas from the implementation of rules which limit the VOC content of architectural coatings (commonly referred to as architectural industrial maintenance, or AIM, coatings). In addition to submitting comments, data and information, interested parties may also request to meet with EPA to present their recommended approaches and rationales.

DATES: Please submit comments, data, and information on or before October 17, 2005. Requests to meet with EPA should be made on or before September 30, 2005.

ADDRESSES: Submit your written comments, data and information, identified by Docket ID No. OAR–2005–0148, by one of the following methods:

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

Agency Web site: http://www.epa.gov/edocket. EDOCKET, EPA's electronic public docket and comment system, is EPA's preferred method for receiving comments. Follow the on-line instructions for submitting comments.

E-mail: Send electronic mail (e-mail) to EPA Docket Center at *a-and-r-Docket@epa.gov.*

Fax: Send faxes to the EPA Docket Center at (202) 566–1741.

Mail: Air and Radiation Docket, U.S. Environmental Protection Agency, Mail Code 6102T, 1200 Pennsylvania Avenue, NW., Washington, DC 20460. Attn: Docket ID No. OAR–2005–0148, *Advance Notice for Information on Determining the Emissions Reductions Achieved from Limiting the VOC Content of Architectural Coating.* Please include a total of two copies.

Hand Delivery or Courier: EPA Docket Center (Air and Radiation Docket), U.S. Environmental Protection Agency, EPA West Building, Room B102, 1301 Constitution Avenue, NW., Washington, DC 20004. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for delivery of boxed information.

Instructions: Direct your comments to Docket ID No. OAR–2005–0148. The 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.epa.gov/edocket*, 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 EDOCKET, regulations.gov or e-mail. The EPA EDOCKET and the federal regulations.gov websites are ''anonymous access'' systems, 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 EDOCKET or 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.

Docket: All documents in the electronic docket are listed in the EDOCKET index at *http://www.epa.gov/edocket.* Although listed in the index, some information is not publicly available, *i.e.*, 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 in EDOCKET or in hard copy during normal business hours at the Air and Radiation Docket, (EPA/DC) EPA West, Room B102, 1301 Constitution Ave.,

NW., Washington, DC. The EPA Docket Center 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 Reading Room is (202) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Marcia L. Spink, Associate Director for Air Programs, Air Protection Division, Mail Code 3AP20, U.S. EPA Region III, 1650 Arch Street, Philadelphia, PA 19103, telephone (215) 814–2104, or by e-mail at *spink.marcia@epa.gov.* To schedule a meeting with EPA, please contact David Sanders, U.S. EPA, Ozone Policy & Strategies Group, Air Quality Strategies & Standards Division, Mail Code C539–02, Office of Air Quality Planning & Standards, Research Triangle Park, NC 27711, telephone (919) 541–3356, or by e-mail at *sanders.dave@epa.gov.*

SUPPLEMENTARY INFORMATION: Throughout this document, the terms ''we'' and ''its'' refer to the EPA.

I. Background

On May 13, 2005 (70 FR 25688), EPA published a final rule approving several State Implementation Plan (SIP) revisions for the District of Columbia, State of Maryland and Commonwealth of Virginia, including the post 1999–2005 Rate-of-Progress (ROP) plan for the Metropolitan Washington, DC 1-Hour Severe Ozone Nonattainment Area (the Washington area). That ROP plan relied upon, among other control measures, VOC emissions reductions from the District's, Maryland's and Virginia's SIP-approved AIM coatings rules to satisfy certain contingency measure requirements applicable to ROP plans.

These States' SIP-approved AIM coatings rules are based upon a model rule developed by the Ozone Transport Commission (OTC). The EPA's SIP approval of the District's, Virginia's and Maryland's AIM coating rules, themselves (70 FR 24959, 24970, 24979; May 12, 2005, respectively), involved no consideration or approval of an amount of VOC emissions reductions or credits achieved by those States' AIM coatings rules. Rather, EPA's basis for approval of these States' AIM coating rules, as well as Delaware's, Pennsylvania's and New York's OTC model rule-based AIM coatings rules (67 FR 70315, November 22, 2002; 69 FR 68080, November 23, 2004; and 69 FR 72118, December 13, 2004, respectively) as SIP revisions was its determination that those AIM rules are as stringent or more stringent than the otherwise applicable Federal AIM coatings rule.[1]

In publishing this action, EPA is not reopening its SIP approvals of any State AIM coatings rule or the Federal AIM coatings rule. The EPA is not reopening its determination that the SIP-approved State AIM rules are as stringent or more stringent than the otherwise applicable Federal AIM rule. Nor is EPA reopening its approval of the Washington area ROP plan, its decision with respect to credit for VOC reductions due to the State AIM rules in the Washington area ROP plan, or any SIP approval EPA has made to date in which credit for VOC reductions have been claimed due to either a State AIM coatings rule or the Federal AIM coatings rule. Please do not submit comments on any completed rulemakings.

As stated previously, however, the Washington area's post 1999–2005 ROP plan submitted by the District, Maryland and Virginia did rely upon, among other control measures, VOC emissions reductions from the three jurisdictions' AIM coatings rules to satisfy certain contingency measure requirements applicable to ROP plans. As part of EPA's proposed rulemaking process on the Washington area post 1999–2005 ROP plan, we independently performed calculations of the VOC emissions reductions achieved by implementation of the District's, Maryland's and Virginia's AIM coatings rules. The EPA did this analysis to confirm that implementation of the AIM coatings rules in Maryland, Virginia, and the District of Columbia would result in at least the amount of VOC emissions reductions relied upon by the States and the District of Columbia for those rules in the Washington area ROP plan.

During the public comment period of the proposed rule to approve the Washington area ROP plan (70 FR 2085; January 12, 2005), EPA received several comments, from both the regulated sector and the State of Maryland, related to the methodology and the associated baseline EPA employed to calculate the VOC emissions reductions from the three jurisdictions' AIM coatings rules. In the final rule approving the Washington area post 1999–2005 ROP plan (70 FR 25688; May 13, 2005), EPA explained that it was not necessary to choose a particular methodology or baseline in order to approve the ROP plan because all of the approaches presented by EPA or the commenters resulted in calculated VOC emissions reductions from implementation of Maryland, Virginia, and the District of Columbia's AIM coatings rules sufficient to satisfy the requirements of the ROP plan.

While it was not necessary to choose a particular methodology or baseline in order for EPA to approve the Washington area post 1999–2005 ROP plan, this may not always be the case. In the future, states may design reasonable further progress, attainment and maintenance plans for ozone nonattainment areas which rely upon VOC emissions reductions from the implementation of AIM coatings rules. For consistency from state to state in the development of such plans, and in EPA's subsequent evaluation of those plans, we are soliciting comments, data, information and recommendations as to the baseline and calculation methodology for determining the emission reductions achieved from the implementation of rules which limit the VOC content of AIM coatings. The EPA is commencing this process in recognition of the need to formulate a technically sound and consistent approach that states may use to account for the VOC emissions from the AIM coatings sector in compiling base year and projection emission inventories, demonstrating reasonable further progress, and conducting modeling analyses as part of their ozone SIP planning activities. The EPA included the following paragraph in its final rule approving the Washington area's post 1999–2005 ROP plan: ''However, EPA recognizes the need to resolve conclusively how to determine the amount of VOC emission reductions achieved from the implementation of AIM coatings rules in a given ozone nonattainment area. This remains an issue of concern to the states, the regulated sector, and other interested parties. Therefore, EPA intends to conduct a separate process to solicit further comment, information and recommendations from all interested parties as to how to determine the amount of VOC emission reductions achieved from the implementation of AIM coatings rules in a given ozone nonattainment area.'' By publishing this Advance Notice to Solicit Comments, Data and Information for Determining the Emissions Reductions Achieved in Ozone Nonattainment and Maintenance Areas from the Implementation of Rules Limiting the VOC Content of AIM Coatings, EPA is hereby commencing the separate process referenced in our final approval of the ROP plan for the Washington area.

[1] See 40 CFR, part 59, subpart D—National Volatile Organic Compound Emission Standards for Architectural Coatings; source: 63 FR 48877, September 11, 1998.

Those parties interested in participating in this process by submitting comments, data information or recommendations may find the Supplementary Technical Support Document (TSD) which EPA prepared in support of the final rule approving the Washington area post 1999–2005 ROP plan (70 FR 25688; May 13, 2005) to be a useful reference with regard to these issues. This TSD presents some helpful examples of baselines and methodologies used to calculate the VOC emissions reductions achieved from the implementation of AIM coating rules.[2] This TSD is available, upon request, from the EPA Region 3 contact listed in the **FOR FURTHER INFORMATION CONTACT** section of this document, and is also in the EDOCKET (OAR–2005–0148–0002) for this action.

II. EPA's Intent Regarding the Comments, Data, Information and Recommendations

It is EPA's intent to consider all relevant comments, data, information, and recommendations submitted to us to formulate a practicable, technically sound approach for calculating the VOC emissions achieved and creditable from the implementation of an AIM coatings rule in a given ozone nonattainment or maintenance area. As previously stated, EPA is commencing this process in recognition of the need to formulate a technically sound and consistent approach that States may use to account for the VOC emissions from the AIM coatings sector in compiling base year and projection emission inventories, demonstrating reasonable further progress, and conducting modeling analyses as part of their ozone SIP planning activities. It would also provide for consistency in EPA's subsequent evaluations of states' attainment, maintenance and progress plans that rely upon emissions reductions from the AIM coatings sector.

Once EPA receives the comments, data, and information solicited herein, we will determine the appropriate next steps. The EPA believes, at this time, the next steps will likely include rulemaking and/or guidance to provide a practicable and technically sound approach for States, and other interested parties, to use in determining the VOC emissions reductions achieved by the implementation of AIM coating rules in ozone nonattainment and maintenance areas. Any such action will be conducted using notice and comment procedures. Once this rulemaking/guidance has been provided, it will be available for states to use in the development of future state implementation plan (SIP) revisions, if any, that rely upon VOC emissions reductions achieved by the implementation of AIM coating rules in ozone nonattainment and maintenance areas. This rulemaking/guidance will not require any state to amend previously approved SIP revisions, however, it may be used by states, at their discretion, to revise their current SIPs as they deem appropriate.

The EPA encourages all interested parties to participate in this process by submitting relevant comments, data, information and recommendations for how best to calculate the VOC emission reductions achieved from the adoption and implementation of an AIM coating rule in a given nonattainment or maintenance area.

III. Statutory and Executive Order Reviews

Under Executive Order (EO) 12866, Regulatory Planning and Review (58 FR 51735, October 4, 1993), this action is not a ''significant regulatory action'' and is, therefore, not subject to review by the Office of Management and Budget (OMB).

List of Subjects in 40 CFR Part 51

Environmental protection, Air pollution control, Ozone, Volatile organic compounds.

Authority: 42 U.S.C. 7401 *et seq.*

Dated: August 24, 2005.

Stephen L. Johnson,

Administrator.

[FR Doc. 05–17357 Filed 8–30–05; 8:45 am]

BILLING CODE 6560–50–P

[2] By citing to this Supplementary TSD as a reference, EPA is not re-opening its final rule approving the Washington area post-1999–2005 ROP plan (70 FR 25688; May 13, 2005).

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 261

[FRL–7961–4]

Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Proposed Exclusion

AGENCY: The Environmental Protection Agency (the EPA).

ACTION: Proposed rule and request for comment.

SUMMARY: The EPA is proposing to grant a petition submitted by Saturn Corporation (Saturn) to exclude or ''delist'' wastewater treatment plant (WWTP) sludge generated from conversion coating on aluminum at Saturn's integrated automotive assembly facility located at 100 Saturn Parkway in Spring Hill, Tennessee, from the requirements of the hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA). This exclusion would be valid only when the sludge is disposed of in a Subtitle D landfill that is permitted, licensed, or registered by a state to manage industrial solid waste. The EPA used the Delisting Risk Assessment Software (DRAS) in the evaluation of the potential impact of the petitioned waste on human health and the environment.

The EPA bases its proposed decision to grant the petition based on an evaluation of waste-specific information provided by Saturn. This proposed decision, if finalized, conditionally excludes the petitioned waste from the requirements of the RCRA hazardous waste regulations.

If finalized, the EPA would conclude that Saturn's petitioned waste is nonhazardous with respect to the original listing criteria and that there are no other factors that would cause the waste to be hazardous.

DATES: The EPA will accept public comments on this proposed decision until October 17, 2005. The EPA will stamp comments received after the close of the comment period as late. These late comments may not be considered in formulating a final decision. Any person may request a hearing on this proposed decision by filing a request to EPA by September 15, 2005. The request must contain the information prescribed in 40 CFR 260.20(d).

ADDRESSES: Please send three copies of your comments. You should send two copies to the Chief, North Section, RCRA Enforcement and Compliance Branch, Waste Division, U.S. Environmental Protection Agency Region 4, Sam Nunn Atlanta Federal Center, 61 Forsyth Street S.W., Atlanta, Georgia, 30303. You should also send one copy to Mike Apple, Director, Division of Solid Waste Management, Tennessee Department of Environment and Conservation, 5th Floor, L&C Tower, 401 Church Street, Nashville, Tennessee, 37243–1535. You should identify your comments at the top with this regulatory docket number: R4DLP–0502–Saturn. You may submit your comments electronically to Kristin Lippert at *Lippert.Kristin@epa.gov.*

You should address requests for a hearing to Narindar M. Kumar, Chief, RCRA Enforcement and Compliance Branch, Waste Division, U.S. Environmental Protection Agency

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 51

[OAR-2003-0032; FRL-]

Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of Interim Guidance on SIP Development

SUMMARY: The Environmental Protection Agency (EPA) encourages States to consider recent scientific information on the photochemical reactivity of volatile organic compounds (VOC) in the development of state implementation plans (SIPs) designed to meet the national ambient air quality standard (NAAQS) for ozone. This interim guidance summarizes recent scientific findings, provides examples of innovative applications of reactivity information in the development of VOC control measures, and clarifies the relationship between innovative reactivity-based policies and EPA's current definition of VOC at 40 CFR 51.100(s). This interim guidance does not change any existing rules.

ADDRESSES: EPA has established a docket for this action under Docket ID No. OAR-2003-0032. All documents in the docket are listed in the EDOCKET index at http://www.epa.gov/edocket. Although listed in the index, some information may not be publicly available, i.e., Confidential Business Information (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 in EDOCKET or in hard copy at the Docket ID No. OAR-2003-0032, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW, Washington, DC. 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) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

DATES: This policy is effective on **[insert date of publication in the Federal Register]**.

FOR FURTHER INFORMATION CONTACT: William L. Johnson, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division, Mail code C539-02, Research Triangle Park, NC 27711, telephone (919) 541-5245.; fax number: 919-541-0824; e-mail address: Johnson.WilliamL@epa.gov.

Outline

I. General Information

II. Introduction

III. Short History of VOC Reactivity Policy and Science

IV. Use of VOC Reactivity in Developing SIPs

V. Relationship to Existing VOC Exemption Policy

VI. Summary

SUPPLEMENTARY INFORMATION:

I. General Information

Does this Action Apply to Me?

You may be an entity affected by this interim guidance if you are a state or local air pollution control agency that has, or is currently developing, an ozone SIP containing programs to control VOC emissions. Additionally, you may be impacted if you use or emit VOCs in commercial/industrial/manufacturing operations, as well as other consumer/commercial activities. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding "FOR FURTHER INFORMATION CONTACT" section.

This action does not impose any new mandates on States or industry, but rather provides information about options for meeting Clean Air Act mandates that are likely to be more effective, and more cost-effective, than the measures currently employed in most parts of the country.

II. Introduction

Ground level ozone, one of the principal components of “smog,” is a serious air pollutant that harms human health and the environment. In April 2004, EPA designated 126 areas of the country as "nonattainment" for the 8-hour ozone national ambient air quality standards (NAAQS). States and tribes are currently revising State Implementation Plans (SIPs) in order to bring air quality into compliance with the 8-hour ozone standard. The Agency has proposed that these SIP revisions must be submitted to EPA by June 15, 2007. Certain areas will need to submit separate reasonably available control technology (RACT) SIP revisions. There is final action pending that the Agency anticipates will require these revisions to be submitted by September 15, 2006. Some of the areas designated as nonattainment under the 8-hour standard have persistent air quality

problems and will need to employ as many cost-effective controls as possible to achieve the 8-hour ozone NAAQS as expeditiously as practicable but no later than by their attainment date.

The development of measures to reduce ozone concentrations is complicated by the fact that ozone is not directly emitted. It is formed in the air by chemical reactions of nitrogen oxides (NOx) and VOCs in the presence of heat and sunlight. Therefore, ozone SIPs must address emissions of these ozone precursors.

There are thousands of individual chemical species of VOCs that can react to form ozone. It is generally understood that not all VOCs contribute equally to ozone formation and accumulation. Some VOCs react slowly and changes in their emissions have limited effects on local or regional ozone pollution episodes. Some VOCs form ozone more quickly, or they may degrade through a series of reactions that generates more ozone than the reaction pathways of other VOCs. Others not only form ozone themselves, but also enhance ozone formation from other VOCs. The photochemical reactivity of a compound is a measure of its potential to form ozone. By distinguishing between more reactive and less reactive VOCs, it should be possible to decrease ozone concentrations further or more efficiently than by controlling all VOCs equally.

Discriminating between VOCs on the basis of their contributions to ozone formation, or reactivities, is not straightforward. 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. The absolute reactivity of a single compound varies with VOC-NOx ratios, meteorological conditions, the mix of other VOCs in the atmosphere, and the time interval of interest. On the other hand, there are several scientifically valid methods that can be used to develop reactivity "scales" or weighting

approaches based on the relative reactivity of different VOCs, and there is a high correlation between these different methods.

The promise of a more efficient VOC control strategy has led the California Air Resources Board (CARB), EPA, and other organizations to invest in reactivity research. This research has produced improved methods for discriminating between VOCs on the basis of reactivity under a variety of conditions. Applying some of the lessons of this research, California and Texas have developed innovative regulations that use VOC reactivity information to improve the efficiency or effectiveness of VOC controls for specific source categories. As States develop their 8-hour ozone SIPs, EPA encourages them to consider how they may incorporate VOC reactivity information to make their future VOC control measures more effective and efficient.

III. Short History of VOC Reactivity Policy and Research

The issue of VOC reactivity was first recognized by EPA in its initial guidance to States on the preparation of ozone SIPs in 1971. In this initial guidance, EPA emphasized the need to reduce the total mass of organic emissions, but also noted that "substitution of one compound for another might be useful where it would result in a clearly evident decrease in reactivity and thus tend to reduce photochemical oxidant formation." EPA encouraged States to promulgate SIPs with organic emission control provisions similar to those outlined in Los Angeles District's Rule 66, which allowed many VOC species thought to have minimal adverse effects to be exempted from control.

The Rule 66 exempt status for many of these organic emission species was questioned a few years later when research results from field studies conducted between 1971-1974 revealed that

pollutant transport conditions were capable of enhancing ozone formation such that these "exempt" compounds were now considered significant ozone producers. Thus, in 1977, the EPA issued the "Recommended Policy on Control of Volatile Organic Compounds," offering its own, much more limited list of "negligibly reactive" compounds to be exempted [42 FR 35314, July 8, 1977]. As new information about the reactivity of different compounds has become available, EPA has continued to add to the list of negligibly reactive compounds following the logic of the 1977 policy. In 1992, this list of negligibly reactive compounds was explicitly excluded from the definition of VOC when it was codified in 40 CFR 51.100(s) [57 FR 3941, February 3, 1992]. Since 1977, EPA has designated approximately 50 compounds or classes of compounds as negligibly reactive and has excluded these compounds from the regulatory definition of VOC.

Beginning in the early 1990s, CARB has pursued the development of regulatory approaches that more fully discriminate VOCs on the basis of reactivity. In 1991, CARB incorporated a reactivity scale for weighting the emissions of individual VOC species in their low emitting vehicle and clean fuels regulation. The scale was designed to account for the differences in the ozone-forming potential of exhausts from gasoline engines and alternative fueled vehicles. The scale adopted by CARB was the Maximum Incremental Reactivity (MIR) scale, derived using a series of box model simulations with varying VOC composition and VOC-NO_X ratios.[1] The MIR scale is commonly expressed in units of grams of ozone produced per gram of VOC emitted.

Over the course of the 1990s, CARB continued to invest in the development of reactivity scales and to explore their potential regulatory applications. In June 2000, CARB adopted an aerosol coatings regulation that incorporates an updated MIR scale. This regulation is described in

[1] Carter, William P. L. "Development of Ozone Reactivity Scales for Volatile Organic Compounds." *Journal of the Air and Waste Management Association* 44 (1994): 881-99.

more detail below. Currently, CARB is exploring the use of reactivity scales in other programs, including regulations for architectural coatings.

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.[2] 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 projects that have addressed issues such as:

- The sensitivity of ozone to VOC mass reductions and changes in VOC composition;
- The derivation and evaluation of reactivity scales using photochemical airshed models;
- The development of emissions inventory processing tools for exploring reactivity-based strategies; and
- 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 the ability to develop approaches that discriminate between VOCs on the basis of reactivity. These findings include:

- State of the art chamber studies at low VOC-NO_X ratios demonstrate that current atmospheric chemistry models generally perform as well under "real world" conditions as under the high concentration scenarios used in their development.[3]

---

[2] See http://www.cgenv.com/Narsto/reactinfo.html

[3] Carter, William P. L., D.R. Crocker, III, D. R. Fitz, L.L. Malkina, K. Bumiller, C.G. Sauer, J.T. Pisano, C. Bufalino, and C. Song. "A New Environmental Chamber for Evaluation of Gas-Phase Chemical Mechanisms and Secondary Aerosol Formation." *Atmospheric Environment* accepted for publication, July 15, 2005 (in press).

- Substituting emissions of low reactivity compounds for emissions of high reactivity compounds can be effective in reducing 1-hour and 8-hour ozone concentrations. Substitutions based on equal mass, equal carbon, or equal molar concentrations will achieve different levels of ozone reduction depending on the chemicals being substituted. Similar to decreases in mass of VOC emissions, reactivity-based VOC substitution seems to reduce higher concentrations of ozone more than lower concentrations of ozone.[4]
- There are several scientifically valid methods that can be used to calculate reactivity scales, each with different strengths and weaknesses. Although there is a high correlation between the different methods (even the simplest ones), important differences exist in their geographical representativeness and in the amount of spread between low reactivity and high reactivity compounds.[5]
- Using available reactivity scales, it is possible to construct a VOC substitution scenario that will achieve approximately the same ozone reductions as reducing the overall mass of VOC emissions. However, when applied, the substitution scenario may increase ozone in some areas and decrease ozone in others depending on the robustness of the reactivity scale used.[6]
- Several reactivity metrics derived with airshed models (such as the Maximum Ozone Incremental Reactivity to Maximum Incremental Reactivity (MOIR-MIR) and Least

---

[4] Arunachalam, S., R. Mathur, A. Holland, M.R. Lee, D. Olerud, and H. Jeffries. "Investigation of Voc Reactivity Assessment with Comprehensive Air Quality Modeling." Report to the U.S. Environmental Protection Agency, 2003; and Carter, William P. L., Gail S. Tonnesen, and G. Yarwood. "Investigation of Voc Reactivity Effects Using Existing Regional Air Quality Models." Report to the American Chemistry Council, Contract SC-20.0-UCR-VOC-RRWG, 2003.

[5] Carter, William P. L., Gail S. Tonnesen, and G. Yarwood. "Investigation of Voc Reactivity Effects Using Existing Regional Air Quality Models." Report to the American Chemistry Council, Contract SC-20.0-UCR-VOC-RRWG, 2003.

[6] *Ibid*

Squares Relative Reactivity (LS-RR)) appear to be robust over different regions of the country, meteorological episodes, year of analysis, averaging times, and models.[7]

EPA encourages all interested parties to continue working through the RRWG to improve the scientific foundation of VOC reactivity-based regulations. EPA will continue to update its guidance to States as new information becomes available. In the meantime, EPA encourages States to take advantage of the information that is now available in designing future VOC control strategies.

IV. Use of VOC Reactivity in Developing SIPs

Although the traditional approach to VOC control focused on reducing the overall mass of emissions may be adequate in some areas of the country, an approach that discriminates between VOCs based on reactivity is likely to be more effective and efficient. In particular, reactivity-based approaches are likely to be important in areas for which 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

[7] Hakami, A., M.S. Bergin, and A.G. Russell. "Ozone Formation Potential of Organic Compounds in the Eastern United States: A Comparison of Episodes, Inventories, and Domains." *Environmental Science and Technology* 38 (2004): 6748-59; Hakami, A., M. Arhami, and A.G. Russell. "Further Analysis of Voc Reactivity Metrics and Scales." Report to the U.S. Environmental Protection Agency, 2004; and Derwent, R.G. "Evaluation and Characterization of Reactivity Metrics." Report to the U.S. Environmental Protection Agency, 2004.

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

- *Developing accurate, speciated VOC emissions inventories.* EPA encourages States – and particularly States with persistent ozone problems – to develop emissions inventories that include emission estimates for individual VOC species, as opposed to only estimating total VOC mass. This type of information may be especially useful for identifying emissions of the most reactive VOCs in the most VOC-sensitive areas. Currently, most States collect information on the mass of total VOC emissions. For air quality modeling purposes, this mass is apportioned to individual chemical species using EPA-provided profiles for each source category. Many industries, however, calculate their reported total VOC emissions from detailed speciated information that they routinely gather for other reasons. Where appropriate, States may want to gather such detailed speciated information and compare it to the national default speciation profiles.

  States should also consider emerging research on the actual availability of VOCs for atmospheric reaction. In estimating VOC emissions, especially from coatings, solvents, and consumer products, it is often assumed that the entire volatile fraction is emitted and available for photochemical reaction, unless captured by specific control equipment. In some situations, however, otherwise volatile compounds may be trapped in liquid or solid phases or adhere to surfaces such that they are not actually released to the atmosphere. Once emitted into the atmosphere, VOCs may also be scavenged by rain, form particles, or deposit on surfaces.[8] Taking this behavior into account should lead to more accurate VOC

[8] Reactivity Research Working Group. "Final Proceedings of Workshop on Combining Environmental Fate and Air Quality Modeling." Research Triangle Park, NC, 2000.

emissions inventories and photochemical modeling. It may also allow States to consider volatility thresholds or other approaches designed to reflect atmospheric availability in certain types of regulatory programs.

- *Prioritizing control measures using reactivity metrics.* Most States prioritize control measures for implementation based on the cost effectiveness of controlling the total mass of VOCs (i.e., $/ton). Using reactivity metrics and speciated VOC emission information, it is possible to calculate cost effectiveness on the basis of relative ozone formation (i.e., $/ozone decreased). By controlling the most reactive source categories first, a state may be able to decrease the total cost of reaching attainment. For example, Russell, et al.[9] found that in Los Angles, selecting VOC controls on the basis of reactivity would decrease the cost of achieving any given level of ozone reduction as compared to a mass-based strategy up to a certain level of reduction. As more controls are required, the cost of strategies optimized on a reactivity basis converge with the cost of mass-based strategies as all the available controls are applied in both cases.
- *Targeting emissions of highly-reactive VOC compounds with specific control measures.* With speciated emissions information, a state may develop control measures that specifically target sources of the most highly reactive VOCs. In the Houston-Galveston area, a comprehensive field study revealed that fugitive or episodic releases of several highly reactive compounds (e.g., ethylene, propylene, 1,3-butadiene, and butenes) from petroleum refining and petrochemical facilities have contributed significantly to exceedances of the ozone NAAQS. In 2002, after consultation with the local industry, the Texas Commission

[9] Russell, A.G., J.B. Milford, M.S. Bergin, S. McBride, L. McNair, Y. Yang, W.R. Stockwell, and B. Croes. "Urban Ozone Control and Atmospheric Reactivity of Organic Gases." *Science* 269 (1995): 491-95.

on Environmental Quality (TCEQ) issued rules targeting emissions of these highly reactive VOCs from four processes: fugitive releases, flares, process vents, and cooling towers. These first rules emphasized additional monitoring, record keeping, and enforcement rather than establishing individual unit emission limits. In 2004, TCEQ adopted a cap-and-trade program for ethylene and propylene emissions from flares, vents, and cooling towers in Houston. Under this program, each site is assigned a daily and yearly emissions cap. Non-highly reactive VOC emissions may be used to offset highly reactive VOC emissions up to a limit of 5% of the facility's initial cap. The non-highly reactive VOC emission offsets are discounted based on the ratio of the reactivity of the offsets to the reactivity of propylene. EPA has proposed approval of some facets of the Texas rules for the control and monitoring of highly reactive VOCs [70 FR 17640], and the Agency expects to propose action on other program elements, such as the cap-and-trade program, in the near future. Although EPA has not completed its review of the SIP revisions provided by Texas for the Houston-Galveston area, it does seem clear that targeting these highly reactive compounds for additional control will achieve substantial ozone benefit and is more cost effective than a rule targeting all VOCs.

- *Encouraging VOC substitution and composition changes using reactivity-weighted emission limits*. For some VOC source categories, such as paints, coatings, adhesives, and other formulated products, manufacturers may have the flexibility to change product formulations so as to change the composition as well as the mass of the VOC emissions. In some cases, changing the composition of the VOC emissions may be less costly and allow for better product performance than decreasing the mass of VOC emissions, while also providing

greater benefits for ozone control. In 2000, CARB found that manufacturers were having difficulty meeting California's stringent mass-based VOC emission limits for aerosol coatings.[10] After extensive study and consultations with stakeholders, CARB replaced the mass-based emission limits for aerosol coatings with reactivity-weighted emissions limits, using a version of the MIR scale. CARB gathered VOC composition and sales information from manufacturers to create VOC emission profiles for different categories of aerosol coatings products. Using this composition information, CARB calculated the MIR-weighted emission limits that would achieve the same ozone reduction as would have been achieved by the existing mass-based emission limits. To determine compliance with the reactivity-weighted limits, the weight percent of each individual VOC in the product is multiplied by its corresponding MIR value and then summed for all VOCs in the product. All VOCs with MIR values, including those that are considered "negligibly reactive" under the national policy, are included in the calculation. For complex mixtures, such as mineral spirits, CARB performed analyses to assign appropriate MIR values for different mixtures. CARB intends to review and, as appropriate, update the reactivity scale used in the rule to incorporate the latest scientific information. EPA has proposed approval of this rule for inclusion in California's SIP [70 FR 1640, January 7, 2005] and expects to finalize this approval in the near future. EPA and CARB view this rule as an important opportunity to gather additional information about the effectiveness and practical implementation issues associated with a reactivity-based program.

[10] California Air Resources Board. "Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products." 2000.

V. Relationship to Existing VOC Exemption Policy

Although a continuous reactivity scale is likely to be the most effective approach for regulating VOCs in many areas of the country, such an approach is more difficult to develop and implement than traditional mass-based approaches because reactivity-based programs carry the extra burden of characterizing and tracking the full chemical composition of VOC emissions. In addition, although most existing VOC control programs do not discriminate between individual VOCs based on reactivity, they continue to provide significant ozone reduction benefits and will remain in place unless and until they are replaced by programs that achieve the same or greater benefits.

Under virtually all existing programs, EPA and States exclude certain negligibly reactive compounds from the regulatory definition of VOC and thus exempt them from regulation as ozone precursors. This exemption policy serves two important purposes:

1) Because EPA does not give VOC reduction credit for programs that reduce emissions of negligibly reactive compounds, control efforts are focused on emissions that contribute significantly to the formation and accumulation of ozone. The Agency continues to believe that it is not appropriate, and would be misleading, to give VOC reduction credit to States or industries for reducing emissions of compounds that have little or no effect on ozone concentrations.
2) Because negligibly reactive compounds are not subject to regulation as VOCs, industry has an incentive to use negligibly reactive compounds in place of higher reactivity compounds. The exemption approach also creates a strong incentive for industry to invest in the

development of negligibly reactive compounds and low reactivity formulations. The Agency continues to believe that the substitution of "VOC-exempt" compounds for regulated VOCs is an effective ozone control strategy, even though it is not as effective or efficient as the use of a continuous reactivity scale to encourage optimal substitutions in terms of ozone control.

Because the current exemption approach continues to serve these purposes, EPA will continue its efforts to identify negligibly reactive compounds and exclude them from the federal regulatory definition of VOC. The Agency expects that such compounds will also be exempt from state VOC control programs, with exceptions made for specific reactivity-based rules such as the CARB aerosol coatings rule.

Since 1977, EPA has used the reactivity of ethane as the threshold of negligible reactivity. Compounds that are less reactive than or equally reactive to ethane have been deemed negligibly reactive. Compounds that are more reactive than ethane continue to be considered reactive VOCs and subject to control requirements. The selection of ethane is based on a series of smog-chamber experiments that underlies the 1977 policy. In these experiments, various compounds were injected into a smog chamber at a molar concentration that was typical of the total molar concentration of VOCs in Los Angeles ambient air at the time (4 ppmv). NO_X was injected into the chamber at a concentration of 0.2 ppm, and as the chamber was exposed to sunlight, the maximum ozone formed in the chamber was measured. The maximum ozone formed in the chamber was compared to the level of the NAAQS, which at the time was 0.08 ppm of oxidants. Propane was the most reactive compound tested that did not cause a maximum ozone concentration greater than 0.08 ppm. Ethane was somewhat less reactive than propane. Based on these experiments, the Agency determined that

ethane should be used as the benchmark for identifying compounds whose potential contribution to ozone formation was below regulatory concern.

A more recent modeling study conducted under the auspices of the RRWG replicated the essence of the 1970s smog chamber experiments using a state-of-the-art airshed model of the eastern United States. In this study, Carter et al. replaced all anthropogenic VOC emissions with ethane and found that ozone formation decreased almost as much as when all anthropogenic emissions of VOC were removed. When anthropogenic emissions were removed or when they were replaced with ethane, the model still predicted ozone concentrations greater than the level of the NAAQS due to emissions of NO_X and biogenic VOCs.[11]

The metric used to compare the reactivity of a specific compound to that of ethane has varied over time. The primary metric for comparison has been k_{OH}, the molar rate constant for reactions between the subject compound and the hydroxyl radical (OH). In several cases, EPA has also looked at comparisons of MIR values expressed on both a molar and a mass basis. Comparing MIR values on a molar basis versus a mass basis can lead to different conclusions about whether a compound is less reactive or more reactive than ethane. In two cases, acetone [60 FR 31633, June 16, 1995] and tertiary butyl acetate [69 FR 69293, November 29, 2004], EPA has exempted compounds based on the finding that the compounds are less reactive than ethane when compared using incremental reactivity values expressed on a mass basis, even though they were more reactive on a molar basis.

The molar comparison is more consistent with the original smog chamber experiments, which compared equal molar concentrations of individual VOCs, that underlie the selection of

[11] Carter, William P. L., Gail S. Tonnesen, and G. Yarwood. "Investigation of Voc Reactivity Effects Using Existing Regional Air Quality Models." Report to the American Chemistry Council, Contract SC-20.0-UCR-VOC-RRWG, 2003.

ethane as the threshold. The mass-based comparison is consistent with how MIR values and other reactivity metrics are applied in reactivity-based emission limits. The mass-based comparison is slightly less restrictive than the molar-based comparison in that a few more compounds qualify as negligibly reactive.

Given the two goals of the exemption policy articulated above, the Agency believes that ethane continues to be an appropriate threshold for defining negligible reactivity. Furthermore, in light of the second goal of encouraging environmentally beneficial substitutions, EPA believes that a comparison to ethane on a mass basis strikes the right balance between a threshold that is low enough to capture compounds that significantly affect ozone concentrations and a threshold that is high enough to exempt some compounds that may usefully substitute for more highly reactive compounds.

When reviewing compounds that have been suggested for VOC-exempt status, EPA will continue to compare them to ethane using k_{OH} expressed on a molar basis and MIR values expressed on a mass basis. Consistent with past practice, the Agency will consider a compound to be negligibly reactive as long as it is equal to or less reactive than ethane based on either one of these metrics. The Agency will also consider other reactivity metrics that are provided with adequate technical justification, such as metrics based on airshed modeling. States may also wish to identify VOC exemptions in their SIPs in order to encourage VOC substitutions that would reduce ozone formation.

In the past, concerns have sometimes been raised about the potential impact of a VOC exemption on environmental endpoints other than ozone concentrations, including fine particle formation, air toxics exposures, stratospheric ozone depletion, and climate change. EPA has

recognized, however, that there are existing regulatory and non-regulatory programs that are specifically designed to address these issues, and the Agency continues to believe that the impacts of VOC exemptions on environmental endpoints other than ozone formation will be adequately addressed by these programs. The VOC exemption policy is intended to facilitate attainment of the ozone NAAQS, and questions have been raised as to whether the Agency has authority to use its VOC policy to address concerns that are unrelated to ground-level ozone. Thus, in general, VOC exemption decisions will continue to be based solely on consideration of a compound's contribution to ozone formation. However, if the Agency determines that a particular VOC exemption is likely to result in a significant increase in the use of a compound and that the increased use would pose a significant risk to human health or the environment that would not be addressed adequately by existing programs or policies, EPA reserves the right to exercise its judgment in deciding whether to grant an exemption.

In all but one of the past exemption decisions, EPA has exempted negligibly reactive VOCs from record keeping and reporting requirements as well as control requirements. Concerns have been raised that even negligibly reactive compounds, if present in sufficient quantities, can contribute significantly to ozone formation over large spatial scales. Without record keeping and reporting requirements, States and EPA have no regular mechanism for maintaining adequate emissions inventories of negligibly reactive compounds or tracking their collective contribution to ozone concentrations. One approach for addressing this issue would be to require record keeping and reporting of all negligibly reactive VOC emissions. The Agency recognizes, however, that efforts to develop state and local inventories of such emissions are a relatively low priority compared to other activities that are likely to be more important for reducing ozone concentrations.

In particular, as noted above, efforts to develop speciated emissions inventories should be focused on highly reactive compounds because programs targeted at controlling emissions of these compounds are likely to be more effective than simply regulating all VOCs equally.

Another approach that would allow policymakers to track potential increases in emissions of negligibly reactive compounds would be to ask manufacturers who are responsible for VOC exemption petitions to provide EPA with periodic estimates of the magnitude and distribution of emissions of the exempted compound. Although such an approach would not provide detailed information about the location of such emissions, this type of spatial definition is relatively unimportant for compounds with negligible reactivity. The Agency believes that parties submitting VOC exemption requests may be able to provide emissions estimates that are sufficient for purposes of tracking the potential effects of VOC-exempt compound emissions on regional air quality. The Agency may consider such an approach in the future.

VI. Summary

EPA encourages States, and particularly those with persistent ozone nonattainment problems, to consider recent scientific information on VOC reactivity and how it may be incorporated into the development of ozone control measures. Using reactivity information, States may be able to improve the effectiveness and efficiency of their VOC control policies. EPA encourages all interested parties to continue to work through the RRWG to improve the scientific foundation for reactivity-based regulatory approaches. Although most existing VOC control programs do not discriminate between individual VOCs based on reactivity, they continue to

provide significant ozone reduction benefits and will remain in place unless and until they are replaced by programs that achieve the same or greater benefits. Therefore EPA will continue its policy of granting VOC exemptions for compounds that are negligibly reactive. EPA will continue to evaluate new scientific information regarding VOC reactivity and will update this interim guidance as appropriate. This interim guidance does not change any existing rules.

List of Subjects in 40 CFR Part 51

Environmental protection, Administrative practice and procedure, Air pollution control, Intergovernmental relations, Nitrogen dioxide, Ozone, Particulate matter, Reporting and record keeping requirements, Volatile organic compounds.

_____

Dated:

_____

Jeffrey R. Holmstead

Assistant Administrator

for Air and Radiation

A Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared by the Volatile Organic Compounds from Processes and Consumer Products Workgroup

Appendix D: Proposal Tracking Forms

October 31, 2005

Discussion Item

Tracking # VOC-001

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Require all degreasers to be regulated regardless of size	Comprehensive degreaser regulations to affect operations and maintenance, possibly encouraging use of less volatile and aqueous solvents.	Technical Feasibility	Feasible		Based on the Draft New Jersey 2002 Emissions Inventory, degreasers are a large source of VOC emissions. However, the New Jersey standard for degreasers is now equivalent to the Maximum Achievable Control Technology (MACT) standard, therefore the workgroup believes that degreasing industries, regardless of size, are already regulated to the maximum. The workgroup suggests that outreach and enforcement alerts be increased to smaller facilities regarding the MACT standards, conducting efficient degreasing operations, and the potential use of less volatile and aqueous solvents. An additional option is to require all degreasers to obtain a general permit, which may increase rule effectiveness.
		Economic Feasibility	Potential cost savings to regulatee by reducing solvent usage	Requires registration and fee by smaller facilities	
		Environmental Benefits	Reduces VOCs emitted to the air thereby aiding in attainment of the 8-hour ozone and PM2.5 standards There is also a health benefit		
		Implementation Issues	The regulated community will be made aware of new standards	Reductions from this measure at smaller facilities may be difficult to quantify.	
		Compliance Issues			

Discussion Item

Tracking # VOC-002

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusions
Regulate Consumer Products/AIM via reactivity based regulations	Incorporation of reactivity into regulations for consumer products and architectural coatings	Technical Feasibility	CA has adopted reactivity based regulations for aerosol coatings	Feasibility across a broad range of consumer and AIM products unknown at this time. CARB taking first steps to incorporate reactivity into very narrowly focused applications	1) Consider adoption of CA's aerosol coating reactivity based emission standard 2) Move toward reactivity based emission standards for consumer and AIM products as their technical feasibility is demonstrated 3) If the USEPA proceeds with a National reactivity-based regulation for aerosol coatings on a schedule that would allow NJ to implement for SIP credit, then the workgroup recommends that New Jersey should not go forward with a state rule.
		Economic Feasibility	Economic impacts will depend on solvent used to substitute for original and what options a company has to reformulate.		
		Environmental Benefits	Allows less reactive compounds to be used and decrease photochemical reactions. Est. from CA's rule for aerosol coatings shows 9 TPD reduction in VOCs + 3 TPD reduction from reactivity		
		Implementation Issues	The EPA announced that it may propose a national reactivity-based regulation for aerosols at the end of 2005. NJDEP should follow the progress of this possible national rulemaking.	NJDEP must develop a Reactivity Policy	

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusions
		Compliance Issues		A reactivity-based regulation may be difficult to enforce. NJDEP will have to know the exact chemical constituents of each product. The exact formulations will be subject to regulation. This may cause difficulty with enforceability for products that are formulated seasonally or batch by batch. There may also be legal issues with requests for confidential business information. There may also be a transport issue – some formulations are not necessarily less reactive, they are just slower to react (they react further from the point where they emitted).	

Discussion Item

Tracking # VOC-003

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Reduce emissions from Consumer Products	Reduce emissions from consumer products by regulating categories not previously regulated and further reducing emissions from categories already regulated	Technical Feasibility	CARB currently conducting a consumer products survey in order to further regulate this category. Some large companies formulate on a "global basis"	CARB Survey is not complete as of 9/05. The rulemaking schedule has been altered and a rule will not go into effect until the end of 2006 Many smaller companies formulate on a local or regional basis	Consider adoption of additional controls for consumer products. The workgroup also recommends that the State continue to work with USEPA on programs that would grant emission credits without the state being required to adopt their own command and control regulations. This could save the State resources in the long run without sacrificing the emission credits that could be obtained.
		Economic Feasibility		Possible increased costs	
		Environmental Benefits	Reduces VOCs from one of the largest source sectors. CA is looking to achieve reductions of 10-30 TPD from this action		
		Implementation Issues	Large consumer product companies, with national/global markets, formulate to the lowest standard. Canada is debating whether to institute OTC or CA consumer product standards. Europe is looking to CA standards.	Some CA limits are technology forcing and some companies may not ultimately be able to formulate to these limits.	
		Compliance Issues			

Discussion Item

Tracking # VOC-004

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusions
Accelerate use of new Portable Fuel Containers (PFC)	New PFCs emit less VOC and reduce spillage. Thus incentives to replace older cans, such as by making older cans unfillable or a "change-out program", should result in increased VOC emission reductions earlier than expected	Technical Feasibility	Change out programs exist in other states	Will one be able to make older cans inoperable?	Consider two prong program to accelerate use of new PFCs: 1) An educational program on the amount of emissions associated with older PFCs and their use, coupled with a change-out and/or rebate program possibly through partnership with a company or use of SEP money and 2) Consider mandatory use of new PFCs by not allowing gas stations to fill PFCs unless they are approved. Implementation of the educational program gets the subject on the public's radar screen and offers them an opportunity to be proactive. Mandatory program completes the turnover.
		Economic Feasibility		Change out programs require expenditures	
		Environmental Benefits	New PFC emit 6.59 TPD less VOC		
		Implementation Issues		Requires public outreach and education on the topic	
		Compliance Issues			

Discussion Item

Tracking # VOC-005

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusions
Require new technology to limit the venting of gasoline from underground storage tanks (USTs) at gasoline dispensing facilities	New technology virtually eliminates venting from gasoline storage tanks and increases product recovery	Technical Feasibility	Two systems are available; one is CARB approved. Does not require that tanks be dug up. Could be easily installed in existing service stations.	The CARB approval is not related to emission reductions but for making Stage 2 vacuum assist systems compatible with ORVR. Also, the systems have been viewed in MD as a means to limit MTBE contamination from fugitive underground vapor emissions.	Further evaluate applicability of this new technology as an emission reduction technology. If deemed appropriate, consider requiring use of this technology on Stage 2 vacuum assist systems. The technology could be required for new service stations. Small/independent facilities could be provided with economical incentives (i.e. tax deductions) to encourage installation of the device.
		Economic Feasibility	Product recovery incentive	Initial capital expense estimated at $30,000-50,000 The expense may be too costly for privately owned stations.	
		Environmental Benefits	Emissions for this category are ~1900 TPY and it is estimated that there are ~4300 facilities.		
		Implementation Issues	This measure would only apply to Stage 2 vacuum assist systems because most venting releases occur from vacuum assist systems. Due to capital expense, would probably be most cost and environmentally effective to limit requirement to high throughput facilities or phase-in from large to small throughput facilities. DEP's minor sources section estimates that many larger stations are vacuum assist and this proposal could be most beneficial at the largest sources.		
		Compliance Issues			

Discussion Item

Tracking # VOC-006

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusions
Improve and maintain emission reduction measures associated with gasoline dispensing	Various measures such as, not “topping off”, improvement of Stage II “boots”, looking at fleet re-fueling, improved ‘Weights & Measures’ testing, and increased enforcement.	Technical Feasibility	Requires no new technology		Consider the following actions: Educational outreach to both commercial stations and private fleets: - no topping-off - maintenance of Stage II boots Work with DCA Weights & Measures regarding required fuel dispensing measures testing – e.g. do not conduct testing on high temperature days; new system for returning test liquid back to storage tank Increased enforcement of no topping-off requirement
		Economic Feasibility			
		Environmental Benefits	Decreases VOCs from spillage and prevents spills	It will be difficult to quantify reductions	
		Implementation Issues		May be difficult to enforce without educational outreach to gasoline attendants	
		Compliance Issues			

This is a parking lot issue

Discussion Item

Tracking # VOC-007

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusions
Investigate marine ballasting emissions		Technical Feasibility			No control measure recommended for consideration This inventory category should be reviewed with EPA as it was suggested that these types of emissions no longer occur because tankers either have double hulls or ballast only tanks. In addition, new US rules will only allow double hull tankers in US waters starting in 2010. Many tankers have dedicated ballast compartments, which do not require displacement. Of those that do not have dedicated ballast compartments, most of the ballast water has to be sent to a controlled tank (floating roof) due to the water quality.
		Economic Feasibility			
		Environmental Benefits			
		Implementation Issues			
		Compliance Issues			

Discussion Item

Tracking # VOC-008

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Improve control efficiency at bulk storage tanks (petrochemical and chemical)	Improve efficiency of control devices at very large storage tanks	Technical Feasibility	New seal designs are more efficient and durable than when the regulations were originally enacted.		Although there was some debate among the workgroup about whether or not floating roofs demonstrate a State of the Art level in controlling emissions, NJDEP suggests that bulk tanks continue to be a large source of VOC emissions. Therefore, additional controls could be considered and additional tanks could potentially be required to meet the standards imposed on newer tanks by federal NSPS and MACT standards. Applicability thresholds based on size, volatility, and other factors as developed for the NSPS and MACT regulations, should be retained or applied to tanks they do not apply to.
		Economic Feasibility		If you try to reduce emissions that are already small, there is no cost benefit	
		Environmental Benefits	Emission factors in TANKS program are out of date.		
		Implementation Issues	Need to specify construction requirements for tank roofs. Need to be consistent with API requirements/standards.		
		Compliance Issues			

Discussion Item

Tracking # VOC-009

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Increase capture and destruction efficiency requirement at graphic arts sources	Change NJAC 7:27-16.7(h) from capture/destruction efficiency of 70% to 90 or 95% for sources which already have or install control devices (NJAC 7:27 – 16.7 (h) only pertains to equipment that already has add-on controls)	Technical Feasibility	Feasible – Others have this capture efficiency in accordance with SOTA requirements		Representatives of graphic arts trade associations stated the current SOTA requirements fulfill this proposal and that graphic arts should not be controlled further. There remains some concern on the part of NJDEP regarding the number of graphic arts operations with pre-1997 permits (SOTA creation). The graphic arts associations will work with NJDEP to quantify the number of potentially affected facilities**.**
		Economic Feasibility		Could increase costs to smaller businesses	
		Environmental Benefits			
		Implementation Issues	Capture efficiency on modern equipment already exists up to100%, therefore this action would primarily address destruction efficiency	Requires rule revision RACT needs to be re-defined in this instance – what is really *reasonable*?	
		Compliance Issues	The SOTA manual for graphic arts requires this proposed measure; however, this only applies to new or modified sources		

Discussion Item

Tracking # VOC-010

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusions
Lower exclusion rate for surface coating sources	Change NJAC 7:27-16.7(e) to apply to all facilities that utilize surface coatings in excess of one gallon per day. [Current regulation applies to facilities that use 2.5 gallons per day]	Technical Feasibility	Feasible	Businesses may not be able to reformulate	This proposal was discussed based on reasonably large aggregate emissions from various surface coating operations in the inventory. The workgroup opposed this idea due to the unknown amount of emission reductions and possible burdens on smaller businesses.
		Economic Feasibility		Affects medium sized businesses	
		Environmental Benefits		This action may not result in emission reductions	
		Implementation Issues	Re-formulated products are already available on the market for use by larger businesses.	Businesses that use between 1 and 2.5 gallons per day of coating products will have to re-formulate or implement new controls	
		Compliance Issues			

Discussion Item

Tracking # VOC-011

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Reduce emissions from refinery flares	Decrease VOC emissions from predictable stream refinery flaring	Technical Feasibility	Is technically feasible	There are safety issues with putting controls on refinery flares	Each flaring incident should be recorded and analyzed. Volumetric flow rates and flare composition should be monitored and recorded. Flare recovery systems should be installed and operated.
		Economic Feasibility	There is some economic feasibility to affected sources.	Flare recovery systems require major capital investment, and high maintenance	
		Environmental Benefits	One of the largest remaining point sources within the inventory Both NJDEP permitting staff and industry representatives feel that the inventory for this source should be further evaluated	Many NJ sources may already be covered under EPA Consent Decrees.	
		Implementation Issues	Flare emissions from many refineries are being controlled by enforcement actions and consent decrees by EPA and State regulatory agencies.		
		Compliance Issues			

Discussion Item

Tracking # VOC-012

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Investigate VOC controls for landfills	Improve controls and capture efficiency of emissions from active and closed landfills.	Technical Feasibility		Generally difficult	An estimated 547 TPY of VOC is emitted from many closed and small landfills and do not warrant further review. Many large or active landfills have energy recovery systems. A State of the Art policy (possibly following NSPS standards) should be considered for landfills with potential to emit greater than 10 TPY.
		Economic Feasibility	If there is sufficient concentration for flaring or energy recovery, then yes	Most closed landfills in NJ are small emitters and not economically efficient to control. Most large or open landfills do have energy recovery.	
		Environmental Benefits	Reduces VOCs found in LFG	There will not be a large amount of reductions	
		Implementation Issues			
		Compliance Issues			

This is a parking lot issue

Discussion Item

Tracking # VOC-013

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Improve NJDEP emissions inventory	No control measure but improved assessment of emissions from sources in NJ	Technical Feasibility	Feasible	"Best available" calculation methodology, no calculations are perfect	Consider forming a workgroup or reaching out to specific sectors of industry to help improve the inventory Consider improvements to the software that is used to calculate emissions
		Economic Feasibility	Part of ongoing NJDEP effort	Man-hour intensive; dependent upon level of details	
		Environmental Benefits	Allows focus on most needed controls		
		Implementation Issues			
		Compliance Issues			

Discussion Item

Tracking # VOC-014

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Require the use of green cleaning/ maintenance products, not including adhesives, for State contracts	Change purchasing specifications to require the use of green products for State contracts (schools, universities, etc.).	Technical Feasibility	Although this is technically feasible, the Green Seal Std 37 – a quickly evolving defacto 'green' designation made by a private, for profit company, only evaluates environmental factors and does not take other factors, such as whether or not the product 'works' in the green form, into account.	Green products may not disinfect as well as other products	The workgroup agreed that this measure will not be feasible due to technical, economic, environmental, and implementation issues.
		Economic Feasibility		May have a negative impact on janitorial supply companies	
		Environmental Benefits	Less VOCs emitted to the atmosphere	Some green products use more reactive VOCs than traditional products	
		Implementation Issues		Performance of products is not included in green standards.	
		Compliance Issues			

Discussion Item

Tracking # VOC-015

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Reduce emissions from bulk storage tank cleaning	Capture and control emissions from bulk tank cleaning.	Technical Feasibility	Emissions can be controlled with a portable thermal oxidizer.	Safety Concerns	Emissions from bulk tank cleaning could be reviewed for safety and feasibility of capture and control. The control may be a portable thermal oxidizer or other control measures may be adopted upon further review of the issue.
		Economic Feasibility			
		Environmental Benefits	Emissions are estimated at approximately 2 tons per tank	Some industry representatives stated that the emissions from tank cleaning are minimal. Tank cleaning is conducted infrequently (once every 10-20 years on an API schedule).	
		Implementation Issues			
		Compliance Issues			

Discussion Item

Tracking # VOC-016

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Further reduce emissions from public owned treatment works (POTW)	Not many of these sources are controlled under MACT standards	Technical Feasibility		Adding control measures may reduce the efficiency of a treatment system	This VOC source should be studied to determine whether or not there are significant emissions to be controlled. Note: *Additional information pertaining to this proposal was submitted to NJDEP after the last workgroup meeting. This information is included as a white paper and included in Appendix D of the workgroup report.*
		Economic Feasibility		Convert and Control methods exist but may not be economically feasible	
		Environmental Benefits		It is difficult to identify how much is released to the air vs. how much is digested by the "bugs"	
		Implementation Issues		These sources currently exempted under NJAC 7:27-8.2(d)4	
		Compliance Issues			

Discussion Item

Tracking # VOC-017

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Include additional source locations under leak detection and repair requirements (LDAR)	Place leak detection requirements on heat exchangers and big equipment at chemical plants, Conduct remote observations via imaging technology	Technical Feasibility	Technologically feasible imaging equipment is available and in use elsewhere to identify leaks and potentially unknown VOC sources		The requirement of additional sources of leak detection and repair is suggested by the workgroup. The further use of imaging technology as a tool to identify fugitive leaks and potentially a tool for outreach and education is strongly suggested by the workgroup.
		Economic Feasibility	Feasible for consultants or DEP to purchase a few shared units.	Prohibitive for every site to purchase this equipment	
		Environmental Benefits	Fugitive emission leaks could be greatly reduced, possibly also identify stack sources		
		Implementation Issues	Decision must be made to either: require annual review by facilities to self report or… NJDEP may be able to pursue this technology as an enforcement and educational outreach tool.		
		Compliance Issues		Data currently may not be of “enforcement quality”	

This is a parking lot issue

Discussion Item

Tracking # VOC-018

Proposal	Control Measure Description	Criteria for Consideration	Discussion Pros	Discussion Cons	Conclusion
Emissions from graphic arts sources	Emission factor needs to be updated	Technical Feasibility			Evaluate graphic arts emission inventory calculations and emission factors. Note: *EPA funded and completed a study on emission factors for use in the Graphic Arts industry sector. The study concluded that the factor should be .05 pounds per capita per year.*
		Economic Feasibility			
		Environmental Benefits			
		Implementation Issues			
		Compliance Issues			

A Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared by the Volatile Organic Compounds from Processes and Consumer Products Workgroup

Appendix E: White Papers

October 31, 2005

White Papers Submitted by the Volatile Organic Compounds from Processes and Consumer Products Workgroup

Title	Author	Corresponding Proposal(s)
Reactivity-Based Approaches to Control VOCs A Compendium of Recent Developments	ACC American Solvents Council	VOC-002
Letter addressed to Mr. Heil and the Members of the VOC Air Workgroup dated September 6, 2005	National Paint and Coatings Association	VOC-002
White Paper on Future Regulation of Consumer and Commercial Products by the New Jersey Department of Environmental Protection – Tracking # VOC - 003	Consumer Specialty Products Association	VOC-003
White Paper on Future Regulation of Consumer and Commercial Products by the New Jersey Department of Environmental Protection – Tracking # VOC - 003	Cosmetic, Toiletry and Fragrance Association	VOC-003
NPCA comments on reactivity and emission inventory	National Paint and Coatings Association	VOC-002, VOC-013
Re: Volatile Organic Compounds from Processes and Consumer Products Workgroup: VOC-005 - New membrane technology to control VOCs from gasoline retail tanks.	New Jersey Petroleum Council	VOC-005
Graphic Arts White Paper For the Processes and Consumer Products Workgroup	Graphic Arts Association, Association of Graphic Communications, Specialty Graphic Imaging Association and Flexographic Technical Association	VOC-009, VOC-010, VOC-018
Re: Comments on VOC emissions from publicly owned treatment facilities	Association of Environmental Authorities	VOC-016

Reactivity-Based Approaches to Control VOCs
A Compendium of Recent Developments
Submitted by the ACC American Solvents Council
to NJ DEP VOC Workgroup
September 2005

It has long been understood that VOCs represent a broad range of compounds with varying potential to contribute to ozone formation when released in the ambient environment. Indeed, this concept was the basis of EPA's "Recommended Policy on Control of Volatile Organic Compounds", issued in 1977, which exempted negligibly reactive compounds (42 FR 35314, July 8, 1977). The differential ability of VOCs to participate in atmospheric reactions which can contribute to ozone formation is known as the "relative photochemical reactivity" or simply "relative reactivity" of VOCs.

USEPA recently published interim guidance encouraging states developing SIPs to consider using photochemical reactivity in areas for which VOC control is key to reducing ozone concentrations (Attachment 1). The guidance indicates that scientific advances have addressed areas of uncertainty which previously presented barriers to the use of reactivity in air quality policy and provides examples of innovative applications of reactivity in the development of VOC control measures. The guidance also notes that current federal VOC control programs will remain in place, at least for the time being.

On September 13, 2005, EPA approved California Air Resource Board's (CARB) SIP for ozone, including a reactivity-based approach to reduce ozone formation from aerosol coatings. This regulation mandates that product formulators must meet reactivity-based limits and encourages reductions of higher reactivity VOCs. (Attachments 2 and 3) The process by which CARB estimates "ozone-equivalent" VOC reductions is described in documentation provided in Attachment 4.

These EPA documents indicate that relative reactivity-based approaches can result in improved air quality benefit over mass-based limits, and that this benefit can be quantified for SIP emission reduction credits (which in the CA aerosol coatings rule exceeded alternatively-calculated mass-based credits). The CARB Aerosol Coatings Rule is provided in Attachment 5, and a presentation to the VOC workgroup that provides a general overview of the CARB aerosol coatings rule, including logistics, benefits, and implementation considerations, is found in Attachment 6.

List of Attachments:

Attachment 1: 70FR 54046, September 13, 2005: Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans.
Attachment 2: 70FR 1640, January 7, 2005: Proposed Rule: 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.
Attachment 3: 70FR 53930, September 13, 2005: Final Rule: 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.
Attachment 4: CARB, May 2000. Initial Statement of Reasons: Chapter 4: Use of Photochemical Reactivity as an Ozone Control Approach. http://www.arb.ca.gov/regact/conspro/aerocoat/aerocoat.htm
Attachment 5: CARB Aerosol Coatings Rule.
Attachment 6: American Chemistry Council, 2005. Successfully creating a reactivity-based program for control of VOCs in consumer products and coatings.

and the corresponding one-time total cost to all respondents will be $24,800. Since this information collection is voluntary and does not involve any special equipment, respondents will not incur any capital or operation and maintenance (O&M) costs.

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.

Dated: September 2, 2005.

Deborah Y. Dietrich,

Director, Office of Emergency Management.

[FR Doc. 05–18091 Filed 9–12–05; 8:45 am]

BILLING CODE 6560–50–M

ENVIRONMENTAL PROTECTION AGENCY

[FRL–7968–8]

Science Advisory Board Staff Office; Notification To Convene Workgroups of Experts for Rapid Consultative Advice on Scientific and Technical Issues From Hurricane Katrina

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The EPA Science Advisory Board (SAB) Staff Office announces its intent to convene workgroups of experts drawn from the U.S. EPA SAB, the Clean Air Scientific Advisory Committee, and the Advisory Council on Clean Air Compliance Analysis (chartered advisory committees), their standing committees, subcommittees, and advisory panels to provide rapid consultative advice on scientific and technical issues in the aftermath of Hurricane Katrina.

FOR FURTHER INFORMATION CONTACT: Members of the public who wish to obtain information about the rapid consultative advice process and projects may contact Dr. Anthony F. Maciorowski, Associate Director for Science, Science Advisory Board Staff Office, by telephone at (202) 343–9983; by e-mail at *maciorowski.anthony@epa.gov;* or by mail at the U.S. EPA, Science Advisory Board (1400F), 1200 Pennsylvania Avenue, NW, Washington, DC 20460.

SUPPLEMENTARY INFORMATION: The SAB was established by 42 U.S.C. 4365 to provide independent scientific and technical advice, consultation, and recommendations to the EPA Administrator on a technical basis for Agency positions and regulations. The SAB anticipates that the scope and scale of environmental destruction in Mississippi, Louisiana and Alabama will lead EPA Program Offices and Regions to request advice on an array of scientific and technical issues. Rapid consultative advice from nationally recognized scientists and engineers will assist the Agency in developing and implementing timely and scientifically appropriate responses to Hurricane Katrina induced destruction and contamination along the Gulf Coast.

To expedite the development of advice on Hurricane Katrina related issues, the SAB Staff Office will convene workgroups of technical experts drawn from the U.S. EPA SAB, the Clean Air Scientific Advisory Committee, the Advisory Council on Clean Air Compliance Analysis (chartered advisory committees), their standing committees, subcommittees, and advisory panels. Workgroup members will be invited to serve based on their scientific and technical expertise, knowledge, and experience; availability and willingness to serve; absence of financial conflicts of interest; and scientific credibility and impartiality. Due to critical mission and schedule requirements, there is insufficient time to provide the full 15 days notice in the **Federal Register** prior to advisory committee meetings, pursuant to the final rule on Federal Advisory Committee Management codified at 41 CFR 102–3.150. Therefore, information on the workgroup consultations will be posted on the SAB Web site at *http://www.epa.gov/sab* as they are available.

Dated: September 8, 2005.

Vanessa Vu,

Director, EPA Science Advisory Board Staff Office.

[FR Doc. 05–18227 Filed 9–12–05; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[OAR–2003–0032; FRL–7965–4]

Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of interim guidance on SIP development.

SUMMARY: The Environmental Protection Agency (EPA) encourages States to consider recent scientific information on the photochemical reactivity of volatile organic compounds (VOC) in the development of State implementation plans (SIPs) designed to meet the national ambient air quality standard (NAAQS) for ozone. This interim guidance summarizes recent scientific findings, provides examples of innovative applications of reactivity information in the development of VOC control measures, and clarifies the relationship between innovative reactivity-based policies and EPA's current definition of VOC. This interim guidance does not change any existing rules.

DATES: This interim guidance is effective on September 13, 2005.

ADDRESSES: EPA has established a docket for this action under Docket ID No. OAR–2003–0032. All documents in the docket are listed in the EDOCKET index at *http://www.epa.gov/edocket.* Although listed in the index, some information may not be publicly available, *i.e.*, Confidential Business Information (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 in EDOCKET or in hard copy at the Docket ID No. OAR–2003–0032, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. 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) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: William L. Johnson, Office of Air Quality Planning and Standards, Air Quality Strategies and Standards Division, Mail code C539–02, Research Triangle Park, NC 27711, telephone (919) 541–5245.; fax number: (919) 541–

0824; e-mail address: *Johnson.WilliamL@epa.gov*.

SUPPLEMENTARY INFORMATION:

Outline

I. General Information
II. Introduction
III. Short History of VOC Reactivity Policy and Science
IV. Use of VOC Reactivity in Developing SIPs
V. Relationship to Existing VOC Exemption Policy
VI. Summary

I. General Information

Does This Action Apply to Me?

You may be an entity affected by this interim guidance if you are a State or local air pollution control agency that has, or is currently developing, an ozone SIP containing programs to control VOC emissions. Additionally, you may be impacted if you use or emit VOCs in commercial/industrial/manufacturing operations, as well as other consumer/commercial activities. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

This action does not impose any new mandates on States or industry, but rather provides information about options for meeting Clean Air Act mandates that are likely to be more effective, and more cost-effective, than the measures currently employed in most parts of the country.

II. Introduction

Ground level ozone, one of the principal components of ''smog,'' is a serious air pollutant that harms human health and the environment. In April 2004, EPA designated 126 areas of the country as ''nonattainment'' for the 8-hour ozone national ambient air quality standards (NAAQS). States and tribes are currently revising State Implementation Plans (SIPs) in order to bring air quality into compliance with the 8-hour ozone standard. The Agency has proposed that these SIP revisions must be submitted to EPA by June 15, 2007. Certain areas will need to submit separate reasonably available control technology (RACT) SIP revisions. There is final action pending that the Agency anticipates will require these revisions to be submitted by September 15, 2006. Some of the areas designated as nonattainment under the 8-hour standard have persistent air quality problems and will need to employ as many cost-effective controls as possible to achieve the 8-hour ozone NAAQS as expeditiously as practicable but no later than by their attainment date.

The development of measures to reduce ozone concentrations is complicated by the fact that ozone is not directly emitted. It is formed in the air by chemical reactions of nitrogen oxides (NO_X) and VOCs in the presence of heat and sunlight. Therefore, ozone SIPs must address emissions of these ozone precursors.

There are thousands of individual chemical species of VOCs that can react to form ozone. It is generally understood that not all VOCs contribute equally to ozone formation and accumulation. Some VOCs react slowly and changes in their emissions have limited effects on local or regional ozone pollution episodes. Some VOCs form ozone more quickly, or they may degrade through a series of reactions that generates more ozone than the reaction pathways of other VOCs. Others not only form ozone themselves, but also enhance ozone formation from other VOCs. The photochemical reactivity of a compound is a measure of its potential to form ozone. By distinguishing between more reactive and less reactive VOCs, it should be possible to decrease ozone concentrations further or more efficiently than by controlling all VOCs equally.

Discriminating between VOCs on the basis of their contributions to ozone formation, or reactivities, is not straightforward. 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. The absolute reactivity of a single compound varies with VOC–NO_X ratios, meteorological conditions, the mix of other VOCs in the atmosphere, and the time interval of interest. On the other hand, there are several scientifically valid methods that can be used to develop reactivity ''scales'' or weighting approaches based on the relative reactivity of different VOCs, and there is a high correlation between these different methods.

The promise of a more efficient VOC control strategy has led the California Air Resources Board (CARB), EPA, and other organizations to invest in reactivity research. This research has produced improved methods for discriminating between VOCs on the basis of reactivity under a variety of conditions. Applying some of the lessons of this research, California and Texas have developed innovative regulations that use VOC reactivity information to improve the efficiency or effectiveness of VOC controls for specific source categories. As States develop their 8-hour ozone SIPs, EPA encourages them to consider how they may incorporate VOC reactivity information to make their future VOC control measures more effective and efficient.

III. Short History of VOC Reactivity Policy and Research

The issue of VOC reactivity was first recognized by EPA in its initial guidance to States on the preparation of ozone SIPs in 1971. In this initial guidance, EPA emphasized the need to reduce the total mass of organic emissions, but also noted that ''substitution of one compound for another might be useful where it would result in a clearly evident decrease in reactivity and thus tend to reduce photochemical oxidant formation.'' EPA encouraged States to promulgate SIPs with organic emission control provisions similar to those outlined in Los Angeles District's Rule 66, which allowed many VOC species thought to have minimal adverse effects to be exempted from control.

The Rule 66 exempt status for many of these organic emission species was questioned a few years later when research results from field studies conducted between 1971–1974 revealed that pollutant transport conditions were capable of enhancing ozone formation such that these ''exempt'' compounds were now considered significant ozone producers. Thus, in 1977, the EPA issued the ''Recommended Policy on Control of Volatile Organic Compounds,'' offering its own, much more limited list of ''negligibly reactive'' compounds to be exempted (42 FR 35314, July 8, 1977). As new information about the reactivity of different compounds has become available, EPA has continued to add to the list of negligibly reactive compounds following the logic of the 1977 policy. In 1992, this list of negligibly reactive compounds was explicitly excluded from the definition of VOC when it was codified in 40 CFR 51.100(s) (57 FR 3941, February 3, 1992). Since 1977, EPA has designated approximately 50 compounds or classes of compounds as negligibly reactive and has excluded these compounds from the regulatory definition of VOC.

Beginning in the early 1990s, CARB has pursued the development of regulatory approaches that more fully discriminate VOCs on the basis of reactivity. In 1991, CARB incorporated a reactivity scale for weighting the emissions of individual VOC species in their low emitting vehicle and clean fuels regulation. The scale was designed to account for the differences in the ozone-forming potential of exhausts from gasoline engines and alternative fueled vehicles. The scale adopted by

CARB was the Maximum Incremental Reactivity (MIR) scale, derived using a series of box model simulations with varying VOC composition and VOC-NO_X ratios.[1] The MIR scale is commonly expressed in units of grams of ozone produced per gram of VOC emitted.

Over the course of the 1990s, CARB continued to invest in the development of reactivity scales and to explore their potential regulatory applications. In June 2000, CARB adopted an aerosol coatings regulation that incorporates an updated MIR scale. This regulation is described in more detail below. Currently, CARB is exploring the use of reactivity scales in other programs, including regulations for architectural coatings.

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.[2] 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 projects that have addressed issues such as:

- The sensitivity of ozone to VOC mass reductions and changes in VOC composition;
- The derivation and evaluation of reactivity scales using photochemical airshed models;
- The development of emissions inventory processing tools for exploring reactivity-based strategies; and
- 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 the ability to develop approaches that discriminate between VOCs on the basis of reactivity. These findings include:

- State of the art chamber studies at low VOC-NO_X ratios demonstrate that current atmospheric chemistry models generally perform as well under ''real world'' conditions as under the high concentration scenarios used in their development.[3]
- Substituting emissions of low reactivity compounds for emissions of high reactivity compounds can be effective in reducing 1-hour and 8-hour ozone concentrations. Substitutions based on equal mass, equal carbon, or equal molar concentrations will achieve different levels of ozone reduction depending on the chemicals being substituted. Similar to decreases in mass of VOC emissions, reactivity-based VOC substitution seems to reduce higher concentrations of ozone more than lower concentrations of ozone.[4]
- There are several scientifically valid methods that can be used to calculate reactivity scales, each with different strengths and weaknesses. Although there is a high correlation between the different methods (even the simplest ones), important differences exist in their geographical representativeness and in the amount of spread between low reactivity and high reactivity compounds.[5]
- Using available reactivity scales, it is possible to construct a VOC substitution scenario that will achieve approximately the same ozone reductions as reducing the overall mass of VOC emissions. However, when applied, the substitution scenario may increase ozone in some areas and decrease ozone in others depending on the robustness of the reactivity scale used.[6]
- Several reactivity metrics derived with airshed models (such as the Maximum Ozone Incremental Reactivity to Maximum Incremental Reactivity (MOIR-MIR) and Least Squares Relative Reactivity (LS-RR)) appear to be robust over different regions of the country, meteorological episodes, year of analysis, averaging times, and models.[7]

EPA encourages all interested parties to continue working through the RRWG to improve the scientific foundation of VOC reactivity-based regulations. EPA will continue to update its guidance to States as new information becomes available. In the meantime, EPA encourages States to take advantage of the information that is now available in designing future VOC control strategies.

IV. Use of VOC Reactivity in Developing SIPs

Although the traditional approach to VOC control focused on reducing the overall mass of emissions may be adequate in some areas of the country, an approach that discriminates between VOCs based on reactivity is likely to be more effective and efficient. In particular, reactivity-based approaches are likely to be important in areas for which 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 ways of addressing VOC reactivity in the SIP development process, including:

- *Developing accurate, speciated VOC emissions inventories.* EPA encourages States—and particularly States with persistent ozone problems—to develop emissions inventories that include emission estimates for individual VOC species, as opposed to only estimating total VOC mass. This type of information may be especially useful for identifying emissions of the most reactive VOCs in the most VOC-sensitive areas. Currently, most States collect information on the mass of total VOC emissions. For air quality modeling purposes, this mass is apportioned to individual chemical species using EPA-provided profiles for each source category. Many industries, however, calculate their reported total VOC emissions from detailed speciated information that they routinely gather for other reasons. Where appropriate, States may want to gather such detailed speciated information and compare it to the national default speciation profiles.

States should also consider emerging research on the actual availability of VOCs for atmospheric reaction. In estimating VOC emissions, especially

[1] Carter, William P. L. ''Development of Ozone Reactivity Scales for Volatile Organic Compounds.'' *Journal of the Air and Waste Management Association* 44 (1994): 881–99.

[2] See *http://www.cgenv.com/Narsto/reactinfo.html.*

[3] Carter, William P.L., D.R. Crocker, III, D.R. Fitz, L.L. Malkina, K. Bumiller, C.G. Sauer, J.T. Pisano, C. Bufalino, and C. Song. ''A New Environmental Chamber for Evaluation of Gas-Phase Chemical Mechanisms and Secondary Aerosol Formation.'' *Atmospheric Environment* accepted for publication, July 15, 2005 (in press).

[4] Arunachalam, S., R. Mathur, A. Holland, M.R. Lee, D. Olerud, and H. Jeffries. ''Investigation of VOC Reactivity Assessment with Comprehensive Air Quality Modeling.'' Report to the U.S. Environmental Protection Agency, 2003; and Carter, William P.L., Gail S. Tonnesen, and G. Yarwood. ''Investigation of VOC Reactivity Effects Using Existing Regional Air Quality Models.'' Report to the American Chemistry Council, Contract SC–20.0–UCR–VOC–RRWG, 2003.

[5] Carter, William P.L., Gail S. Tonnesen, and G. Yarwood. ''Investigation of VOC Reactivity Effects Using Existing Regional Air Quality Models.'' Report to the American Chemistry Council, Contract SC–20.0–UCR–VOC–RRWG, 2003.

[6] *Ibid.*

[7] Hakami, A., M.S. Bergin, and A.G. Russell. ''Ozone Formation Potential of Organic Compounds in the Eastern United States: A Comparison of Episodes, Inventories, and Domains.'' *Environmental Science and Technology* 38 (2004): 6748–59; Hakami, A., M. Arhami, and A.G. Russell. ''Further Analysis of VOC Reactivity Metrics and Scales.'' Report to the U.S. Environmental Protection Agency, 2004; and Derwent, R.G. ''Evaluation and Characterization of Reactivity Metrics.'' Report to the U.S. Environmental Protection Agency, 2004.

from coatings, solvents, and consumer products, it is often assumed that the entire volatile fraction is emitted and available for photochemical reaction, unless captured by specific control equipment. In some situations, however, otherwise volatile compounds may be trapped in liquid or solid phases or adhere to surfaces such that they are not actually released to the atmosphere. Once emitted into the atmosphere, VOCs may also be scavenged by rain, form particles, or deposit on surfaces.[8] Taking this behavior into account should lead to more accurate VOC emissions inventories and photochemical modeling. It may also allow States to consider volatility thresholds or other approaches designed to reflect atmospheric availability in certain types of regulatory programs.

• *Prioritizing control measures using reactivity metrics.* Most States prioritize control measures for implementation based on the cost effectiveness of controlling the total mass of VOCs (*i.e.*, $/ton). Using reactivity metrics and speciated VOC emission information, it is possible to calculate cost effectiveness on the basis of relative ozone formation (*i.e.*, $/ozone decreased). By controlling the most reactive source categories first, a State may be able to decrease the total cost of reaching attainment. For example, Russell, *et al.*[9] found that in Los Angles, selecting VOC controls on the basis of reactivity would decrease the cost of achieving any given level of ozone reduction as compared to a mass-based strategy up to a certain level of reduction. As more controls are required, the cost of strategies optimized on a reactivity basis converge with the cost of mass-based strategies as all the available controls are applied in both cases.

• *Targeting emissions of highly-reactive VOC compounds with specific control measures.* With speciated emissions information, a State may develop control measures that specifically target sources of the most highly reactive VOCs. In the Houston-Galveston area, a comprehensive field study revealed that fugitive or episodic releases of several highly reactive compounds (*e.g.*, ethylene, propylene, 1,3-butadiene, and butenes) from petroleum refining and petrochemical facilities have contributed significantly to exceedances of the ozone NAAQS. In 2002, after consultation with the local industry, the Texas Commission on Environmental Quality (TCEQ) issued rules targeting emissions of these highly reactive VOCs from four processes: fugitive releases, flares, process vents, and cooling towers. These first rules emphasized additional monitoring, record keeping, and enforcement rather than establishing individual unit emission limits. In 2004, TCEQ adopted a cap-and-trade program for ethylene and propylene emissions from flares, vents, and cooling towers in Houston. Under this program, each site is assigned a daily and yearly emissions cap. Non-highly reactive VOC emissions may be used to offset highly reactive VOC emissions up to a limit of 5% of the facility's initial cap. The non-highly reactive VOC emission offsets are discounted based on the ratio of the reactivity of the offsets to the reactivity of propylene. EPA has proposed approval of some facets of the Texas rules for the control and monitoring of highly reactive VOCs (70 FR 17640), and the Agency expects to propose action on other program elements, such as the cap-and-trade program, in the near future. Although EPA has not completed its review of the SIP revisions provided by Texas for the Houston-Galveston area, it does seem clear that targeting these highly reactive compounds for additional control will achieve substantial ozone benefit and is more cost effective than a rule targeting all VOCs.

• *Encouraging VOC substitution and composition changes using reactivity-weighted emission limits.* For some VOC source categories, such as paints, coatings, adhesives, and other formulated products, manufacturers may have the flexibility to change product formulations so as to change the composition as well as the mass of the VOC emissions. In some cases, changing the composition of the VOC emissions may be less costly and allow for better product performance than decreasing the mass of VOC emissions, while also providing greater benefits for ozone control. In 2000, CARB found that manufacturers were having difficulty meeting California's stringent mass-based VOC emission limits for aerosol coatings.[10] After extensive study and consultations with stakeholders, CARB replaced the mass-based emission limits for aerosol coatings with reactivity-weighted emissions limits, using a version of the MIR scale. CARB gathered VOC composition and sales information from manufacturers to create VOC emission profiles for different categories of aerosol coatings products. Using this composition information, CARB calculated the MIR-weighted emission limits that would achieve the same ozone reduction as would have been achieved by the existing mass-based emission limits. To determine compliance with the reactivity-weighted limits, the weight percent of each individual VOC in the product is multiplied by its corresponding MIR value and then summed for all VOCs in the product. All VOCs with MIR values, including those that are considered ''negligibly reactive'' under the national policy, are included in the calculation. For complex mixtures, such as mineral spirits, CARB performed analyses to assign appropriate MIR values for different mixtures. CARB intends to review and, as appropriate, update the reactivity scale used in the rule to incorporate the latest scientific information. EPA has proposed approval of this rule for inclusion in California's SIP (70 FR 1640, January 7, 2005) and expects to finalize this approval in the near future. EPA and CARB view this rule as an important opportunity to gather additional information about the effectiveness and practical implementation issues associated with a reactivity-based program.

V. Relationship to Existing VOC Exemption Policy

Although a continuous reactivity scale is likely to be the most effective approach for regulating VOCs in many areas of the country, such an approach is more difficult to develop and implement than traditional mass-based approaches because reactivity-based programs carry the extra burden of characterizing and tracking the full chemical composition of VOC emissions. In addition, although most existing VOC control programs do not discriminate between individual VOCs based on reactivity, they continue to provide significant ozone reduction benefits and will remain in place unless and until they are replaced by programs that achieve the same or greater benefits.

Under virtually all existing programs, EPA and States exclude certain negligibly reactive compounds from the regulatory definition of VOC and thus exempt them from regulation as ozone precursors. This exemption policy serves two important purposes:

(1) Because EPA does not give VOC reduction credit for programs that

[8] Reactivity Research Working Group. ''Final Proceedings of Workshop on Combining Environmental Fate and Air Quality Modeling.'' Research Triangle Park, NC, 2000.

[9] Russell, A.G., J.B. Milford, M.S. Bergin, S. McBride, L. McNair, Y. Yang, W.R. Stockwell, and B. Croes. ''Urban Ozone Control and Atmospheric Reactivity of Organic Gases.'' *Science* 269 (1995): 491–95.

[10] California Air Resources Board. ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products.'' 2000.

reduce emissions of negligibly reactive compounds, control efforts are focused on emissions that contribute significantly to the formation and accumulation of ozone. The Agency continues to believe that it is not appropriate, and would be misleading, to give VOC reduction credit to States or industries for reducing emissions of compounds that have little or no effect on ozone concentrations.

(2) Because negligibly reactive compounds are not subject to regulation as VOCs, industry has an incentive to use negligibly reactive compounds in place of higher reactivity compounds. The exemption approach also creates a strong incentive for industry to invest in the development of negligibly reactive compounds and low reactivity formulations. The Agency continues to believe that the substitution of ''VOC-exempt'' compounds for regulated VOCs is an effective ozone control strategy, even though it is not as effective or efficient as the use of a continuous reactivity scale to encourage optimal substitutions in terms of ozone control.

Because the current exemption approach continues to serve these purposes, EPA will continue its efforts to identify negligibly reactive compounds and exclude them from the federal regulatory definition of VOC. The Agency expects that such compounds will also be exempt from state VOC control programs, with exceptions made for specific reactivity-based rules such as the CARB aerosol coatings rule.

Since 1977, EPA has used the reactivity of ethane as the threshold of negligible reactivity. Compounds that are less reactive than or equally reactive to ethane have been deemed negligibly reactive. Compounds that are more reactive than ethane continue to be considered reactive VOCs and subject to control requirements. The selection of ethane is based on a series of smog-chamber experiments that underlies the 1977 policy. In these experiments, various compounds were injected into a smog chamber at a molar concentration that was typical of the total molar concentration of VOCs in Los Angeles ambient air at the time (4 ppmv). NO_X was injected into the chamber at a concentration of 0.2 ppm, and as the chamber was exposed to sunlight, the maximum ozone formed in the chamber was measured. The maximum ozone formed in the chamber was compared to the level of the NAAQS, which at the time was 0.08 ppm of oxidants. Propane was the most reactive compound tested that did not cause a maximum ozone concentration greater than 0.08 ppm. Ethane was somewhat less reactive than propane. Based on these experiments, the Agency determined that ethane should be used as the benchmark for identifying compounds whose potential contribution to ozone formation was below regulatory concern.

A more recent modeling study conducted under the auspices of the RRWG replicated the essence of the 1970s smog chamber experiments using a state-of-the-art airshed model of the eastern United States. In this study, Carter *et al.* replaced all anthropogenic VOC emissions with ethane and found that ozone formation decreased almost as much as when all anthropogenic emissions of VOC were removed. When anthropogenic emissions were removed or when they were replaced with ethane, the model still predicted ozone concentrations greater than the level of the NAAQS due to emissions of NO_X and biogenic VOCs.[11]

The metric used to compare the reactivity of a specific compound to that of ethane has varied over time. The primary metric for comparison has been k_{OH}, the molar rate constant for reactions between the subject compound and the hydroxyl radical (OH). In several cases, EPA has also looked at comparisons of MIR values expressed on both a molar and a mass basis. Comparing MIR values on a molar basis versus a mass basis can lead to different conclusions about whether a compound is less reactive or more reactive than ethane. In two cases, acetone (60 FR 31633, June 16, 1995) and tertiary butyl acetate (69 FR 69293, November 29, 2004), EPA has exempted compounds based on the finding that the compounds are less reactive than ethane when compared using incremental reactivity values expressed on a mass basis, even though they were more reactive on a molar basis.

The molar comparison is more consistent with the original smog chamber experiments, which compared equal molar concentrations of individual VOCs, that underlie the selection of ethane as the threshold. The mass-based comparison is consistent with how MIR values and other reactivity metrics are applied in reactivity-based emission limits. The mass-based comparison is slightly less restrictive than the molar-based comparison in that a few more compounds qualify as negligibly reactive.

Given the two goals of the exemption policy articulated above, the Agency believes that ethane continues to be an appropriate threshold for defining negligible reactivity. Furthermore, in light of the second goal of encouraging environmentally beneficial substitutions, EPA believes that a comparison to ethane on a mass basis strikes the right balance between a threshold that is low enough to capture compounds that significantly affect ozone concentrations and a threshold that is high enough to exempt some compounds that may usefully substitute for more highly reactive compounds.

When reviewing compounds that have been suggested for VOC-exempt status, EPA will continue to compare them to ethane using k_{OH} expressed on a molar basis and MIR values expressed on a mass basis. Consistent with past practice, the Agency will consider a compound to be negligibly reactive as long as it is equal to or less reactive than ethane based on either one of these metrics. The Agency will also consider other reactivity metrics that are provided with adequate technical justification, such as metrics based on airshed modeling. States may also wish to identify VOC exemptions in their SIPs in order to encourage VOC substitutions that would reduce ozone formation.

In the past, concerns have sometimes been raised about the potential impact of a VOC exemption on environmental endpoints other than ozone concentrations, including fine particle formation, air toxics exposures, stratospheric ozone depletion, and climate change. EPA has recognized, however, that there are existing regulatory and non-regulatory programs that are specifically designed to address these issues, and the Agency continues to believe that the impacts of VOC exemptions on environmental endpoints other than ozone formation will be adequately addressed by these programs. The VOC exemption policy is intended to facilitate attainment of the ozone NAAQS, and questions have been raised as to whether the Agency has authority to use its VOC policy to address concerns that are unrelated to ground-level ozone. Thus, in general, VOC exemption decisions will continue to be based solely on consideration of a compound's contribution to ozone formation. However, if the Agency determines that a particular VOC exemption is likely to result in a significant increase in the use of a compound and that the increased use would pose a significant risk to human health or the environment that would not be addressed adequately by existing programs or policies, EPA reserves the

[11] Carter, William P. L., Gail S. Tonnesen, and G. Yarwood. ''Investigation of VOC Reactivity Effects Using Existing Regional Air Quality Models.'' Report to the American Chemistry Council, Contract SC–20.0–UCR–VOC–RRWG, 2003.

right to exercise its judgment in deciding whether to grant an exemption.

In all but one of the past exemption decisions, EPA has exempted negligibly reactive VOCs from recordkeeping and reporting requirements as well as control requirements. Concerns have been raised that even negligibly reactive compounds, if present in sufficient quantities, can contribute significantly to ozone formation over large spatial scales. Without recordkeeping and reporting requirements, States and EPA have no regular mechanism for maintaining adequate emissions inventories of negligibly reactive compounds or tracking their collective contribution to ozone concentrations. One approach for addressing this issue would be to require recordkeeping and reporting of all negligibly reactive VOC emissions. The Agency recognizes, however, that efforts to develop State and local inventories of such emissions are a relatively low priority compared to other activities that are likely to be more important for reducing ozone concentrations. In particular, as noted above, efforts to develop speciated emissions inventories should be focused on highly reactive compounds because programs targeted at controlling emissions of these compounds are likely to be more effective than simply regulating all VOCs equally.

Another approach that would allow policymakers to track potential increases in emissions of negligibly reactive compounds would be to ask manufacturers who are responsible for VOC exemption petitions to provide EPA with periodic estimates of the magnitude and distribution of emissions of the exempted compound. Although such an approach would not provide detailed information about the location of such emissions, this type of spatial definition is relatively unimportant for compounds with negligible reactivity. The Agency believes that parties submitting VOC exemption requests may be able to provide emissions estimates that are sufficient for purposes of tracking the potential effects of VOC-exempt compound emissions on regional air quality. The Agency may consider such an approach in the future.

VI. Summary

EPA encourages States, and particularly those with persistent ozone nonattainment problems, to consider recent scientific information on VOC reactivity and how it may be incorporated into the development of ozone control measures. Using reactivity information, States may be able to improve the effectiveness and efficiency of their VOC control policies. EPA encourages all interested parties to continue to work through the RRWG to improve the scientific foundation for reactivity-based regulatory approaches. Although most existing VOC control programs do not discriminate between individual VOCs based on reactivity, they continue to provide significant ozone reduction benefits and will remain in place unless and until they are replaced by programs that achieve the same or greater benefits. Therefore EPA will continue its policy of granting VOC exemptions for compounds that are negligibly reactive. EPA will continue to evaluate new scientific information regarding VOC reactivity and will update this interim guidance as appropriate. This interim guidance does not change any existing rules.

List of Subjects in 40 CFR Part 51

Environmental protection, Administrative practice and procedure, Air pollution control, Intergovernmental relations, Nitrogen dioxide, Ozone, Particulate matter, Reporting and recordkeeping requirements, Volatile organic compounds.

Dated: August 25, 2005.

Jeffrey R. Holmstead,

Assistant Administrator for Air and Radiation.

[FR Doc. 05–18015 Filed 9–12–05; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–7967–8]

Clean Water Act Section 303(d): Availability of List Decisions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of availability.

SUMMARY: This action announces the availability of EPA decisions identifying water quality limited segments and associated pollutants in Nevada to be listed pursuant to Clean Water Act Section 303(d)(2), and requests public comment. Section 303(d)(2) requires that states submit and EPA approve or disapprove lists of waters for which existing technology-based pollution controls are not stringent enough to attain or maintain state water quality standards and for which total maximum daily loads (TMDLs) must be prepared.

On September 1, 2005, EPA partially approved and partially disapproved Nevada's 2004 submittal. Specifically, EPA approved Nevada's listing of 205 water body-pollutant combinations, and associated priority rankings. EPA disapproved Nevada's decisions not to list 98 water body-pollutant combinations. EPA identified these additional water bodies and pollutants along with priority rankings for inclusion on the 2004 Section 303(d) list.

EPA is providing the public the opportunity to review its decisions to add waters and pollutants to Nevada 2004 Section 303(d) list, as required by EPA's Public Participation regulations. EPA will consider public comments in reaching its final decisions on the additional water bodies and pollutants identified for inclusion on Nevada's final lists.

DATES: Comments must be submitted to EPA on or before October 13, 2005.

ADDRESSES: Comments on the proposed decisions should be sent to David Smith, TMDL Team Leader, Water Division (WTR–2), U.S. Environmental Protection Agency Region IX, 75 Hawthorne Street, San Francisco, CA 94105, telephone (415) 972–3416, facsimile (415) 947–3537, e-mail *smith.davidw@epa.gov.* Oral comments will not be considered. Copies of the proposed decisions concerning Nevada which explain the rationale for EPA's decisions can be obtained at EPA Region 9's Web site at *http://www.epa.gov/region9/water/tmdl/index.html* by writing or calling Mr. Smith at the above address. Underlying documentation comprising the record for these decisions is available for public inspection at the above address.

FOR FURTHER INFORMATION CONTACT: David Smith at (415) 972–3416 or *smith.davidw@epa.gov.*

SUPPLEMENTARY INFORMATION: Section 303(d) of the Clean Water Act (CWA) requires that each State identify those waters for which existing technology-based pollution controls are not stringent enough to attain or maintain State water quality standards. For those waters, States are required to establish TMDLs according to a priority ranking.

EPA's Water Quality Planning and Management regulations include requirements related to the implementation of Section 303(d) of the CWA (40 CFR 130.7). The regulations require states to identify water quality limited waters still requiring TMDLs every two years. The lists of waters still needing TMDLs must also include priority rankings and must identify the waters targeted for TMDL development during the next two years (40 CFR 130.7).

Consistent with EPA's regulations, Nevada submitted to EPA its listing decisions under section 303(d)(2) on June 2, 2004. Nevada submitted

Federal Register

Friday,
January 7, 2005

Part IV

Environmental Protection Agency

40 CFR Parts 51 and 52

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; Proposed Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 51 and 52

[OAR–2003–0200; FRL–7857–6]

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

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The EPA is proposing to approve a new consumer products regulation as part of the California State Implementation Plan (SIP) for ozone under the Clean Air Act (CAA) as amended in 1990. This California regulation adopts an innovative approach to reduce ozone formation from volatile organic compounds (VOC) in aerosol coating products. The EPA is also proposing to approve the use of California's Tables of Maximum Incremental Reactivity (MIR) to allow implementation of the new regulation in California. We are also proposing to revise EPA's definition of VOCs so that compounds which we previously identified as negligibly reactive and exempt from EPA's regulatory definition of VOCs will now count towards a product's reactivity-based VOC limit for the purpose of California's aerosol coatings regulation. We are taking comments on this proposal and we plan to follow with a final action.

DATES: Comments must be received on or before March 8, 2005.

ADDRESSES: Submit your comments, identified by Docket ID No. OAR–2003–0200, by one of the following methods:

- Federal eRulemaking Portal: *http://www.regulations.gov.* Follow the on-line instructions for submitting comments.
- Agency Web site: *http://www.epa.gov/edocket.* EDOCKET, EPA's electronic public docket and comment system, is EPA's preferred method for receiving comments. Follow the on-line instructions for submitting comments.
- E-mail: *a-and-r-Docket@epa.gov.*
- Fax: 202–566–1741.
- Mail: OAR Docket: OAR–2003–0200, Environmental Protection Agency, Mailcode: 6102T, 1200 Pennsylvania Ave., NW., Washington, DC 20460.
- Hand Delivery: EPA/DC, Public Reading Room, Room B102, EPA West Building, 1301 Constitution Avenue, NW., Washington, DC. 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 Docket ID No. OAR–2003–0200. 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.epa.gov/edocket,* 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 EDOCKET, regulations.gov, or e-mail. The EPA EDOCKET and the federal regulations.gov websites are ''anonymous access'' systems, 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 EDOCKET or 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. For additional information about EPA's public docket visit EDOCKET on-line or see the **Federal Register** of May 31, 2002 (67 FR 38102).

For additional instructions on submitting comments, go to Unit I of the **SUPPLEMENTARY INFORMATION** section of this document.

Docket: All documents in the docket are listed in the EDOCKET index at *http://www.epa.gov/edocket.* Although listed in the index, some information is not publicly available, *i.e.*, 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 in EDOCKET or in hard copy at the OAR Docket, OAR–2003–0200, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. 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) 566–1744, and the telephone number for the OAR Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Stanley Tong, Rulemaking Office (AIR–4), Environmental Protection Agency, Region IX, 75 Hawthorne St., San Francisco, CA 94105; telephone number: (415) 947–4122; fax number: (415) 947–3579; e-mail address: *tong.stanley@epa.gov.*

SUPPLEMENTARY INFORMATION:

I. General Information

A. What Should I Consider as I Prepare My Comments for EPA?

1. *Submitting CBI.* Do not submit this information to EPA through EDOCKET, regulations.gov or e-mail. 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.

2. *Tips for Preparing Your Comments.* When submitting comments, remember to:

i. Identify the rulemaking by docket number and other identifying information (subject heading, **Federal Register** date and page number).

ii. Follow directions—The agency may ask you to respond to specific questions or organize comments by referencing a Code of Federal Regulations (CFR) part or section number.

iii. Explain why you agree or disagree; suggest alternatives and substitute language for your requested changes.

iv. Describe any assumptions and provide any technical information and/or data that you used.

v. If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.

vi. Provide specific examples to illustrate your concerns, and suggest alternatives.

vii. Explain your views as clearly as possible, avoiding the use of profanity or personal threats.

viii. Make sure to submit your comments by the comment period deadline identified.

ix. Please strictly limit comments to the subject matter of this proposal, the scope of which is discussed below. Please identify the section/subsection on which you are commenting so we can group similar comments together and better understand the context of your comment.

x. EPA requests that you also send a copy of your comments to: Andrew Steckel, Rulemaking Office Chief (AIR–4), U.S. Environmental Protection Agency, Region IX, 75 Hawthorne Street, San Francisco, CA 94105–3901.

3. *Docket Copying Costs.* A reasonable fee may be charged for copying.

B. How Do I Request a Public Hearing?

If you wish to request a public hearing to submit comments concerning this proposal please contact Mr. Stanley Tong, Rulemaking Office (AIR–4), U.S. Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105, telephone (415) 947–4122. Requests for a public hearing must be made by January 27, 2005. The EPA will publish a notice of a hearing, if a hearing is requested, in the **Federal Register**. Because the State has already held a public notice and comment period for its aerosol coatings rule, any EPA hearing will be strictly limited to the proposed EPA approval of the rule and its inclusion in the California SIP and to the proposed change in the definition of VOCs for 40 CFR 51.100(s). The hearing will not cover the reactivity limits or other specifics of California's rule. If a public hearing is requested, it will be held near our Region IX office in San Francisco, CA.

C. Throughout This Document, "We," "Us" and "Our" Refer to EPA

D. How Can I Get Copies of This Document and Other Related Information?

1. In addition to accessing the official public docket at *http://www.epa.gov/edocket/*, you can also inspect copies of the submitted SIP revision at our Region IX office during normal business hours. EPA requests that you contact the person listed in the **FOR FURTHER INFORMATION CONTACT** section to schedule your inspection. You may also see copies of the submitted SIP revision during normal business hours by appointment at the California Air Resources Board, Stationary Source Division, Rule Evaluation Section, 1001 "I" Street, Sacramento, CA 95814.

2. A copy of California's aerosol coating products regulation can also be downloaded from the following internet addresses. Please be advised that these are not EPA Web sites and may not contain the same version of the regulations that were submitted to EPA. *http://www.arb.ca.gov/consprod/regs/aeropnt.pdf http://www.arb.ca.gov/consprod/regs/Aeropnt.doc*

Table of Contents

I. The State's Submittal.
A. What regulations did the State submit?
B. Are there other versions of this regulation?
C. What is the purpose of the submitted CARB regulation?
III. EPA's Evaluation and Action.
A. How is EPA evaluating the regulation?
B. Does the regulation meet the evaluation criteria?
C. Public comment and final action.
IV. Background Information.
A. Why was this regulation submitted?
B. What is photochemical reactivity?
C. Why is use of the relative reactivity concept appropriate in California's aerosol coatings rule?
D. Are California's relative reactivity-based regulations appropriate for areas outside of California?
E. How will the effectiveness of this reactivity-based program be evaluated?
F. How has CARB addressed concerns about air toxics and ozone-depleting substances?
G. What changes in enforcement strategies will likely occur due to this relative reactivity-based regulation?
IV. Summary of CARB's Aerosol Coatings Regulation.
A. What does CARB's regulation require?
V. Future Actions.
A. What action will be taken to determine if this reactivity-based regulation is effective?
B. How will future uses of relative reactivity be evaluated?
VI. Statutory and Executive Order Reviews.

I. The State's Submittal

A. What Regulations Did the State Submit?

Table 1 lists the regulations addressed by this proposal with the date that they were adopted and submitted to EPA by the California Air Resources Board (CARB).

TABLE 1.—SUBMITTED REGULATIONS

Regulation title	Adopted	Submitted
Aerosol Coating Products	5/1/2001	3/13/2002
Tables of Maximum Incremental Reactivity (MIR) Values	5/1/2001	3/13/2002

On May 7, 2002, we found that this submittal meets the completeness criteria in 40 CFR Part 51, Appendix V, as required before formal EPA review.

B. Are There Other Versions of This Regulation?

There is no previous version of the aerosol coating products regulation approved by EPA into the SIP, although CARB adopted an earlier version of this regulation on March 23, 1995, and submitted it to us on December 18, 1998. On November 19, 1998, CARB adopted amendments to this earlier regulation. The CARB did not submit these amendments to us as a SIP revision. There is no previous stand-alone version of the Tables of MIR values in the SIP applicable to aerosol coatings. Today, we are proposing approval of the CARB aerosol coatings rule submitted to us on March 13, 2002. While we can act on only the most recently submitted version of this regulation, we have reviewed materials CARB provided with the previous SIP submittals for informational purposes. Thus, this version of the aerosol coatings rule replaces the earlier versions developed by CARB and, if we approve it, will be the first such rule in the California SIP.

C. What Is the Purpose of the Submitted CARB Regulation?

The regulation covers aerosol coatings, aerosol clear coatings, and aerosol stains. It applies to any person who sells, supplies, offers for sale, applies, or manufactures for use in California any aerosol coating subject to the limits in the regulation. The regulation imposes reactivity-based VOC limits on these products for purposes of reducing ozone caused by VOC emissions.

In the current SIP submittal, CARB has developed a new approach for regulating VOC emissions from aerosol coatings. Traditionally, the VOC emissions from aerosol and other coatings have been controlled by limiting the mass of all VOCs in a product, and VOC content limits of aerosol coatings were expressed as a maximum percent by mass of all VOC. The new approach taken by CARB incorporates the concept of VOC photochemical reactivity. This concept relies on the fact that the same weight/amount of some VOCs (*e.g.*, xylene) has the potential to form more ozone, or to form ozone more quickly, than the same weight/amount of other VOCs (*e.g.*, propane) once they are emitted into the ambient air under the same conditions.

The CARB estimates that its previous mass-based VOC control rule for aerosol coatings resulted in statewide aerosol coating VOC emissions reductions of 9

tons per day (tpd) from the 1989 baseline estimated VOC emissions of 30 tpd of VOC. The CARB calculates that the new reactivity-based aerosol coatings rule in the current submittal would achieve the ''equivalent'' of an additional 3.1 tpd of VOC mass-based reductions statewide. In other words, CARB estimates that this rule will achieve reactivity-based VOC reductions that would be the equivalent of 12.1 tons of mass-based VOC reductions from the 1989 baseline, measured in terms of ozone reduction. The CARB intends its new regulation to encourage manufacturers to reduce use of VOCs with higher reactivity, thereby achieving more ozone reductions than through traditional VOC mass-based regulations.

III. EPA's Evaluation and Action

A. How Is EPA Evaluating the Regulation?

Generally, SIP regulations must be enforceable (see section 110(a)(2)(A) of the CAA), must at a minimum require Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures (RACM) in nonattainment areas (see, for example, sections 172(c)(1), 182(a)(2)(A) and 182(b)(2)), must not interfere with attainment and reasonable further progress or any other applicable requirement of the CAA, and must achieve the pollution reduction requirements of the CAA (see section 110(l)). The CARB's aerosol coatings regulation applies to both ozone attainment and non-attainment areas statewide. Because this regulation covers nonmajor area sources that are not covered by a Control Techniques Guidelines (CTG) document, it is not subject to the RACT requirements for ozone nonattainment areas (CAA, section 182(b)(2)).

Guidance and policy documents that we used to help evaluate enforceability requirements includes: Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations; Clarification to Appendix D of November 24, 1987 **Federal Register,**'' (Blue Book), May 25, 1988, (revised 1/11/90), Office of Air Quality Planning and Standards. We also relied on several technical reports and journals to evaluate CARB's SIP submittal. These reports and journals are referenced in footnotes in the body of this proposal and are included in the docket for this proposal.

B. Does the Regulation Meet the Evaluation Criteria?

We believe that the aerosol coatings rule will improve the SIP by establishing stringent VOC limits for this product category, by improving enforcement through labeling and reporting requirements, and by creating an incentive for the use of solvents with relatively low contribution to ozone formation. The regulation is generally consistent with relevant policy and guidance regarding enforceability. Our approval of the rule would also be consistent with CAA section 110(l), because there is no prior version of the aerosol coatings regulation in the SIP and ozone reductions resulting from the approval of this regulation into the SIP will help in the State's efforts to achieve attainment with the national ambient air quality standard (NAAQS) for ozone. RACT requirements do not apply to the source category covered by the CARB rule because RACT applies to major stationary sources in nonattainment areas and source categories covered by a CTG. Because of their widespread use in relatively small amounts, aerosol coatings are considered area sources rather than major stationary sources. EPA has not issued a CTG or a rule for this category. However, even though federal RACT or consumer product requirements do not yet apply, CARB took the initiative in 1995 to go beyond basic federally mandated VOC reduction requirements by adopting an aerosol coatings regulation with two tiers of aggressive mass-based VOC limits. In its current SIP submittal, CARB is amending its existing regulation by replacing the mass-based limits with reactivity-based limits intended to achieve additional ozone reduction benefits.

Although CARB's existing mass-based aerosol coatings regulation has significantly reduced emissions from aerosol coatings, CARB has concluded that more reductions are needed to help reduce the high ozone concentrations in Southern California and the Central Valley. The CARB also believes that some VOC mass-based limits in the previous version of the rule presented particularly difficult reformulation challenges for manufacturers of water-based coatings,[1] and the State concluded that it may not be feasible to achieve additional VOC reductions from a traditional VOC mass-based program. The current SIP submittal relies on the relative reactivity concept, that is, the fact that individual species of VOC react in the atmosphere to form different amounts of ozone or to form ozone at different rates. The CARB hopes to target VOC emission reductions to better control a product's contribution to ozone formation by encouraging reductions of higher reactivity VOCs, rather than by treating all VOCs in a product alike through a mass-based rule. The submitted regulation therefore consists of reactivity-based limits that replace the existing mass-based VOC limits for aerosol spray coatings.

Although EPA is supportive of reactivity-based programs, we recognize that they may be more complex to develop, enforce, and evaluate than mass-based programs. As a result, it is particularly important for us to evaluate the State agency's ability to implement such programs. The CARB has addressed these concerns partly through an extensive public process spanning over 3 years in the development of the aerosol coatings rule. The CARB held eight public workshops and over 20 meetings with industry, leading scientists, local air districts, and EPA. The CARB also gathered detailed information on the sales and composition of aerosol coatings, funded extensive research on VOC reactivity scales and their applicability to environmental conditions in California, and took steps intended to ensure that no backsliding would occur from adoption of the relative-reactivity approach. To account for potential changes in MIR values as scientific knowledge improves, CARB also committed to improve and update its program by including in its Board resolution[2] the provision ''[t]o review the Tables of Maximum Incremental Reactivity (MIR) Values 18 months after the effective date of the amendments, and every 18 months thereafter, to determine if modifications to the MIR values are warranted.'' The CARB will also ''[r]eview the reactivity-based limits before January 1, 2007 to determine if modifications are necessary to reflect changes to the MIR values and return to the Board with any recommended modifications to the reactivity-based limits.''[3]

Additional details about the comparison of reactivity-based reductions to VOC mass-based reductions, the appropriateness of CARB's reactivity research to areas outside of California, and the evaluation of the effectiveness of CARB's regulation are provided in the Background section below.

[1] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Chapter VII, page 60, May 5, 2000.

[2] State of California Air Resources Board Resolution 00–22, June 22, 2000, Agenda Item No. 00–6–1.

[3] State of California Air Resources Board Resolution 00–22, June 22, 2000, Agenda Item No. 00–6–1.

Information normally found in a Technical Support Document (TSD) is incorporated into this proposed rule. A separate TSD has not been written for this proposed rulemaking.

C. Public Comment and Final Action

Because EPA believes the submitted aerosol coatings regulation fulfills all relevant requirements, we are proposing to approve it into the California SIP as authorized in section 110(k)(3) of the CAA. We are also proposing to approve the use of CARB's Tables of MIR values in California for the purpose of implementation of the aerosol coatings regulation. We intend to grant SIP credit for the ozone equivalent VOC mass-based reductions that are achieved by CARB's reactivity-based regulation. Details on the methodology CARB used to determine the equivalent VOC mass-based tonnage reduction achieved by its reactivity regulation is discussed in the CARB staff report.[4]

Currently, EPA's regulatory definition of VOC (40 CFR 51.100(s)) excludes certain compounds, such as methane and ethane, which EPA has determined to have negligible photochemical reactivity with respect to the formation of ozone. California's reactivity-based regulation, however, requires the inclusion of the assigned MIR scale reactivity value of each organic compound present in the volatile portion of a product, even if the compound's reactivity value is so low that EPA has previously determined it to be negligibly reactive and therefore exempt.

In order to approve CARB's aerosol coatings rule, EPA proposes to modify our regulatory definition of VOC so that compounds previously excluded will now be counted towards a product's reactivity-based VOC limit for the limited purpose of CARB's aerosol coatings reactivity-based regulation. Under 40 CFR 51.100(s), EPA has 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 exemption-based system separates organic compounds into reactive and negligibly reactive compounds. The CARB's reactivity-based regulation makes this distinction unnecessary because CARB's rule assigns each compound a reactivity factor that accounts for its relative contribution to ozone formation. These previously exempted compounds will continue to be excluded from the Federal definition of VOCs for other purposes.

We will accept comments from the public on this proposed approval of the CARB aerosol rule into the SIP and the proposed modification of our definition of VOC for the next 60 days. Unless we receive convincing new information during the comment period, we intend to publish a final approval action that will incorporate the regulations listed in Table 1 into the federally enforceable SIP and modify our definition of VOC to support CARB's aerosol coating rule.

The EPA, with CARB's assistance, intends to evaluate the performance of this reactivity-based regulation in 3 years. This will allow time to compile data on the implementation of, and compliance with, the regulation, and will allow time to conduct additional technical analysis such as modeling efforts needed to evaluate the effect of the regulation on ambient ozone levels. We encourage CARB to use this time to collect data on the costs and effectiveness of this regulation, both to the regulated entities and to the regulators. In particular, EPA is interested in how implementation of this regulation affects the development of detailed emission inventories, as well as industry compliance costs, including recordkeeping and compliance testing, manufacturing or material costs, product quality and price. Towards this goal, we are relying upon CARB's Board resolution[5] which ''[d]irects the Executive Officer to take the following actions: (1) Monitor the progress of manufacturers in meeting the reactivity-based VOC limits, (2) propose any future regulatory modifications that may be appropriate, and (3) continue to evaluate emerging technologies for aerosol coatings to determine if additional ozone reductions will be feasible in the future.''

The proposed approval of CARB's aerosol coatings regulation based upon VOC reactivity is limited to this source category for this State. EPA believes that relative reactivity-based regulations may help provide the flexibility necessary to achieve further emissions reductions from some source categories to address persistent ozone nonattainment problems in areas of the country that need further reductions in VOC emissions to come into attainment with federal ozone standards. EPA is committed to continuing its support of research on the suitability of relative reactivity-based regulations to other geographic regions and to other source categories through the national Reactivity Research Working Group (RRWG) of which CARB and EPA are members.[6] The purpose of the RRWG is to encourage and sponsor research on scientific questions concerning VOC reactivity which may be of interest to regulators. This group is affiliated with NARSTO (formerly known as the North American Research Strategy for Tropospheric Ozone) and is a voluntary organization currently composed of industry, government and academic representatives. The group has an open membership and anyone may attend the meetings and participate.

The EPA is specifically seeking public comment on how reactivity-based programs might affect industry compliance and recordkeeping costs to support effective implementation and enforcement, and how industry and regulatory agency costs and staff requirements might change with respect to emission inventories.

We are not seeking comments on the reactivity limits or other specifics of CARB's rule; nor are we seeking comments on EPA's VOC exemption process. The EPA has previously published in 63 FR 48792 (September 11, 1998) its views on reactivity as it relates to the regulation of VOC emissions from consumer products pursuant to CAA § 183(e) and this proposal should not be construed as a change in the Agency's interpretation of that provision. When commenting, please indicate which section of this proposal you are commenting on so we can group similar comments together.

III. Background Information

A. Why Was This Regulation Submitted?

Ground level ozone, commonly referred to as ''smog,'' is a serious air pollutant that harms human health and the environment. Ground level ozone is a complex problem that is difficult to control in part because ozone is not emitted directly by specific sources. It forms in the air when there are chemical reactions between nitrogen oxides (NO_X) and VOCs in the presence of heat and sunlight. Therefore, one way to reduce ozone levels in many areas is to control emissions of VOCs. Section 110(a) of the CAA requires States to submit regulations that control VOC emissions as part of the State's SIP.

B. What Is Photochemical Reactivity?

There are thousands of individual species of VOC chemicals that can

[4] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Chapter II, page 37, May 5, 2000.

[5] State of California Air Resources Board Resolution 00–22, June 22, 2000, Agenda Item No. 00–6–1.

[6] See ''VOC Reactivity'' at *http://www.cgenv.com/Narsto/*.

combine with NO_X and the energy from sunlight to form ozone. The impact of a given VOC on formation of ground-level ozone is sometimes referred to as its ''reactivity.'' It is generally understood that not all VOCs are equal in their effects on ground-level ozone formation. Some VOCs react extremely slowly and changes in their emissions have limited effects on ozone pollution episodes. Some VOCs form ozone more quickly, or they may form more ozone than other VOCs. Others not only form ozone themselves, but also enhance ozone formation from other VOCs. By distinguishing between more reactive and less reactive VOCs, however, it should be possible to decrease ozone concentrations further or more efficiently than by controlling all VOCs equally.

Assigning a value to the reactivity of a compound is not straightforward. 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. The reactivity of a single compound varies with VOW–NO_X ratios, meteorological conditions, the mix of other VOCs in the atmosphere, and the time interval of interest. Designing an effective regulation that takes account of these interactions is difficult, and implementing and enforcing such a regulation carries the extra burden of characterizing and tracking the full chemical composition of VOC emissions.

1. History of EPA's VOC Policy

Historically, EPA's general approach to regulation of VOC emissions has been based upon control of total VOCs by mass, without distinguishing between individual species of VOC. EPA considered the regulation of VOCs 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 SIP preparation guidance.[7] In that guidance, EPA emphasized the need to reduce the total mass of VOC emissions, but it 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,[8] which allowed some VOCs that were believed to have low to moderate reactivity to be exempted from control. The exempt status of many of those VOCs 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.[9]

In 1977, this research led EPA to issue the second version of its 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 SIPs, which explicitly excludes compounds that have been identified as negligibly reactive [40 CFR 51.100(s)]. To date, EPA has exempted 53 compounds or classes of compounds in this manner.

In effect, EPA's current VOC exemption policy has resulted in a two-bin system in which most compounds are treated equally as VOCs and are controlled and a separate smaller group of compounds are treated as negligibly reactive and are exempt from VOC control.[10] This approach was intended to encourage the reduction of emissions of all VOCs 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 have 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 have occurred even though, between 1970 and 2003, population, vehicle miles traveled, and gross domestic product have risen 39 percent, 155 percent and 176 percent respectively. [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]

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.[11] EPA recognizes that, in theory, a well designed reactivity-based program, in which each individual VOC is regulated more or less stringently based on its actual contribution to ozone formation, would be more efficient than the current approach. On the other hand, there are significant practical difficulties involved in designing, implementing, and enforcing such a program. We believe that the CARB program we are proposing to approve today will help EPA and other States to evaluate whether the benefits of a reactivity-based approach are sufficient to outweigh these practical difficulties.

We also recognize that, in spite of the progress that most parts of the country

[7] U.S. Environmental Protection Agency. ''Requirements for Preparation, Adoption, and Submittal of Implementation Plans.'' **Federal Register,** 36 FR 15486–15506 (1971).

[8] County of Los Angles, Air Pollution Control District (1972). Rules and Regulations. Rule 66 (1966). Amended November 2, 1972.

[9] Dimitriades, B. ''Oxidant/03 Air Quality Benefits from Emission Substitution.'' In: ''Proceedings. Hydrocarbon Control Feasibility. Its Impact on Air Quality'' (and references herein). Speciality Conference, Air Pollution Control Association, April, 1977.

[10] It should be noted that EPA has also taken VOC reactivity into consideration in other ways, such as the development of the consumer and commercial product regulations under CAA § 183(e). EPA considered VOC reactivity as a factor in developing the federal consumer products program as directed by the statute, and EPA's approach was confirmed by the courts. *See, Allied Local & Regional Mfrs. Caucus* v. *EPA,* 215 F.3d 61 (D.C. Cir. 2000), cert. denied 532 U.S. 1018 (2001). The EPA plans to develop its own regulation for aerosol coating products under CAA § 183(e). Our future regulation may differ from CARB's regulation. If this turns out to be the case, a process will need to be developed to verify that the State's requirements and limits are at least as stringent as those in the national standard.

[11] 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).

have made in reducing ozone concentrations, further reductions in VOC emissions will likely be needed to bring a number of areas into attainment with the 8-hour ozone standard. In particular, in areas where significant VOC emission controls are already in place, further mass-based emission reductions may be difficult or very expensive to achieve. In such situations, regulations that distinguish between individual VOCs and create an incentive to shift production and use from more reactive VOCs to less reactive VOCs may provide the flexibility necessary to continue progress towards attainment of the ozone NAAQS.

2. History of CARB's Reactivity Work

Regulatory authorities in California have been experimenting with the concept of reactivity-based regulations for some time. The first regulation in California that took reactivity into account was Rule 66,[12] adopted in the mid 1960s by LACAPCD. This rule restricted emissions of certain classes of compounds which were defined by the rule as photochemically reactive based on their chemical structure (*e.g.,* compounds having olefinic type of unsaturation) to 40 pounds per day, but allowed up to 3000 pounds per day emissions for many other organic compounds which were not defined by the rule as photochemically reactive. In other words, Rule 66 sought to regulate certain VOCs more than others, based on the assumption that some VOCs participate more in ozone formation. Rule 66 was very influential at the time and versions of it were adopted by several other States. However, the VOC control approach taken by Rule 66 has been superseded by EPA's definition of VOC (57 FR 3941, February 3, 1992), which was based on the 1977 EPA policy statement and which only exempted a smaller number of negligibly reactive compounds.

Like EPA's 1977 policy, Rule 66 was really a ''two bin'' system which tightly controlled certain compounds, which were defined as more photochemically reactive, and applied a much lesser level of control to a large class of compounds, which were regarded as less reactive. The main difference between Rule 66 and the later EPA VOC definition approach was the criteria for classifying compounds as exempt (or subject to lesser control), with the EPA definition allowing a much smaller group of compounds to be considered non-reactive or exempt.

In 1991 California adopted regulations intended to differentiate between species of VOC based upon a reactivity scale, instead of a two bin system. The 1991 rules were the Low-Emission Vehicles and Clean Fuels regulations that CARB intended to reduce VOC emissions by mass from motor vehicles generally, but which also took into account VOC reactivity differences in organic gas when comparing the emissions from alternatively fueled vehicles (AFVs).[13] [14] Although not a full-blown attempt to regulate VOCs by their relative reactivity, CARB nonetheless began the exploration of the MIR scale as a mechanism to distinguish between VOCs and encourage reduction of more reactive VOCs.

Today's proposal addresses CARB's most recent effort to utilize the concept of VOC relative reactivity and the MIR scale to regulate VOC emissions. This rule reflects a major shift from the traditional mass-based control strategies for reduction of VOC emissions and introduces this concept in a far more significant way than in CARB's previous actions. In connection with the SIP submittal for this aerosol coatings rule, CARB has provided additional supporting information in the form of journal articles and reports which describe VOC reactivity research efforts.

3. What Research Has Been Conducted in Reactivity?

Much of the work on reactivity scales that CARB used as a basis for its aerosol coatings rule was done at the University of California at Riverside by William P. L. Carter. Carter investigated 18 different ozone reactivity scales.[15] All of these scales are based on chamber studies intended to evaluate the impact of a given VOC on ozone formation under certain assumed conditions. The three most prominent scales he developed were:

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.[16]

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.

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 M. E. Jenkins, who have published articles on a scale called the photochemical ozone creation potential (POCP) scale.[17] This scale was derived for the conditions prevalent in Europe. The POCP scale is roughly consistent with those of Carter although, as expected, there are some differences because the POCP scale is based on European conditions.

The CARB has relied most heavily on Carter's research for its regulatory development and CARB has used the MIR scale for development of the aerosol coating regulation.[18] The MIR scale is designed using certain assumptions about meteorological and environmental conditions where ozone production is most sensitive to changes in hydrocarbon emissions and, therefore, is intended to represent conditions where VOC emission controls will be most effective. The MIR scale is expressed as grams of ozone formed per gram of organic compound reacted. Each compound is assigned an individual MIR value, which enables the reactivities of different compounds to be compared quantitatively. Individual MIR values now exist for many commonly used compounds, and a list of these individual values comprises a scale.

To evaluate reactivity scales and ensure that VOC reactivity is used appropriately in its proposals, CARB created the Reactivity Scientific Advisory Committee (RSAC), a group of leading researchers in the field of atmospheric science. This group reviews CARB's reactivity related work

[12] The South Coast Air Quality Management District (SCAQMD), the successor agency to LACAPCD, renamed this Rule 442.

[13] 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, Sacramento, CA, August 13, 1990.

[14] 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.

[15] Carter, William P. L., ''Development of Ozone Reactivity Scales for Volatile Organic Compounds,'' J. Air & Waste Manage. Assoc., 44: 881–899, (1994).

[16] The CARB's reactivity regulation defines the term Reactive Organic Compound (ROC) as any compound that has the potential, once emitted to contribute to ozone formation in the troposphere. ROCs include compounds which are excluded from EPA's definition of VOCs as found in 40 CFR 51.100(s).

[17] See, for example, R. G. Derwent and M.E. Jenkin, ''Hydrocarbons and the Long-Range Transport of Ozone and PAN Across Europe,'' Atmospheric Environment, 25A, No. 8, 1661–1678, (1991).

[18] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Chapter II, page 12, May 5, 2000.

and convenes periodically in meetings which are open to the public to comment on CARB's work.

The EPA has been closely following the scientific literature on reactivity scales, and is interested in how such reactivity scales might be applied to national programs or programs in other States. Because reactivity depends on the characteristics of the environment as well as the compound, scales are developed to represent a particular set of environmental conditions in certain geographic locations. It is not clear whether a single scale can represent actual ozone formation over the whole country where meteorological and environmental conditions vary considerably. Many scales, including the MIR scale are derived for ozone formed during one day of reaction time. The EPA is interested in whether such scales adequately represent the ozone formation from VOCs during multi-day stagnation events or long-range transport of pollutants, in such places as those seen in the Northeast section of the country, which may take place over several days.

To help answer such questions, EPA and CARB are participating in the RRWG, which sponsored three atmospheric photochemical modeling studies to examine how changing the reactivity of the mix of VOC emissions might affect ozone formation across wide geographical areas over time. The three areas that researchers studied were the Houston area, North Carolina, and the eastern half of the United States. The EPA anticipates that these three studies and follow-up efforts will help to answer many questions about the potential use of relative reactivity in developing, implementing, and enforcing VOC regulatory programs.

C. Why Is Use of the Relative Reactivity Concept Appropriate in California's Aerosol Coatings Rule?

There are five classes of nonattainment for the 1-hour ozone standard, ranging from marginal to extreme. The Los Angeles—South Coast Air Basin Area and the San Joaquin Valley—San Joaquin Valley Air Basin in California are currently the only areas in the nation in the worst category of extreme nonattainment (40 CFR 81.305 and 69 FR 20550). Under the 8-hour standard, there are no areas classified under the ''extreme'' ozone non-attainment category. South Coast is classified as severe non-attainment and San Joaquin is classified as serious non-attainment under the 8-hour standard. Because of the elevated ozone levels in Los Angeles, the San Joaquin Valley and elsewhere in California, CARB has adopted many innovative rules and regulations to help reduce ozone precursor emissions. These efforts include adopting regulations which go beyond current federally-mandated VOC reduction requirements, such as regulating a wider variety of area and mobile sources and establishing aggressive emission standards that force development of new low-emission technologies.

As one such effort, CARB already adopted a statewide regulation in 1995 limiting the VOC mass content of 35 categories of aerosol coatings. This regulation contained two tiers of VOC limits and a provision to extend the compliance deadline for up to 5 years for each aerosol coating category if it was determined that the limits were not feasible. On November 19, 1998, CARB amended the regulation to relax the limits for 12 coating categories after determining that the original limits were not feasible even with the 5-year extension. CARB made limits for 11 other categories more stringent. The CARB also extended the compliance date to January 1, 2002, for all 35 product categories covered by the aerosol coating rule to provide time for manufacturers to comply with the new limits.

In the current SIP submittal, CARB has determined that even with the extended compliance date, some of the VOC content limits remain technologically challenging. In order to preserve the air quality benefits of its 1998 rule, while at the same time allowing manufacturers greater flexibility in reformulating their products, CARB is replacing its pre-existing mass-based VOC limits for aerosol spray coatings with reactivity-based limits that are designed to achieve equivalent air quality benefits. The CARB's explicit goal was to develop reactivity-based limits that would ensure that the ozone reduction commitment from its second tier mass-based VOC limits would not be compromised.[19] For the reasons set forth below, EPA believes that CARB's amended aerosol spray coating regulation achieves this goal.

1. Equivalency of Air Quality Benefits

i. Sufficient information about the source category. In order to determine equivalent ozone reductions and set appropriate limits, CARB collected detailed product speciation information and sales data from manufacturers. For the aerosol coatings category, CARB found that over 80 percent of the species of VOCs typically used as ingredients were well-studied and an additional 17 percent of the species typically used would need only minor adjustment for uncertainty in their MIR values. In other words, CARB concluded that the reactivity values of over 95 percent of the VOCs generally used in the specific category of aerosol coatings were fairly well-studied and understood.[20] The accuracy and completeness of the VOC inventory, and the availability of scientifically reviewed and published reactivity values for those VOCs used in aerosol coatings may not be available for other consumer product categories. The CARB's reactivity regulation defines the term ''reactive organic compound'', or ''ROCs,'' as any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere. The ROCs include compounds which EPA has excluded from the regulatory definition of VOCs found in 40 CFR 51.100(s). To minimize confusion to the reader, we will continue to use the term ''VOC'' in the remainder of this proposal, instead of ''ROC.'' When the term ''VOC'' is used in the context of CARB's reactivity-based aerosol coatings rule, the reader should remember that this refers to all VOCs, including those compounds that are excluded from EPA's regulatory definition of VOC. The accurate identification and measurement of individual VOC compounds and development of accurate MIR values is crucial to the effectiveness of a reactivity program.[21]

ii. Sufficient information about the reactivity scale and its applicability to California. In conjunction with this SIP submittal, CARB provided a listing of approximately 50 research articles to help support its conclusion that this aerosol coatings regulation based upon VOC relative reactivity is appropriate for conditions in California and that the MIR scale chosen by CARB is the most appropriate scale for this regulation.

As stated earlier, CARB relies on the work of Carter in the development of the scale for the aerosol coatings rule. Carter investigated 18 different ozone reactivity scales and concluded ''[t]hat the MIR scale (or a scale similar to it,

[19] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Executive Summary, page 2, May 5, 2000.

[20] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Chapter IV, page 36, May 5, 2000.

[21] B.J. Finlayson-Pitts, J.N. Pitts Jr, ''Atmospheric Chemistry of Tropospheric Ozone Formation: Scientific and Regulatory Implications,'' J. Air Waste Manage. Assoc. 43:1091–1100, (1993).

such as one based on integrated ozone over the standard) is appropriate for regulatory applications where a reactivity scale is required.'' [22] He determined that, while different reactivity scales might give different reactivity orderings of VOCs, for most VOC species the general rankings among the different scales were very similar. He also found that even relatively large variations in the base ROG mixture [23] had, in most cases, only a small effect on relative reactivity. For example, a two-fold increase in the amount of aromatics in the base mixture of VOCs in the chamber study resulted in less than a 20 percent change in the relative MIR reactivity. From this it could be inferred that significant changes in the ambient mixture of VOCs in the atmosphere would not significantly change the relative MIR value.

The various studies conducted to date show good agreement in reactivity values for most VOC species between normalized reactivity scales generated by airshed models and Carter's box-modeled calculations. For example, Bergin *et al.*,[24] summarized a number of papers comparing reactivity scales predicted by airshed models to those predicted by Carter using a box-model. Most of the papers are based on simulations conducted with the Carnegie Mellon/California Institute of Technology model (CIT) for Los Angeles using the ozone episode of August 27–29, 1987. Bergin reports that airshed model-derived spatially weighted results behave similarly to MIRs.[25] The report further states that the greatest differences were found for formaldehyde and other compounds whose reactivities were highly dependent on photolytic reactions, and in general, airshed model results for Los Angeles agree well with MIRs, and further show that individual organics have very different ozone formation impacts.

While Bergin's reactivity assessment indicates a general support for the concept of relative reactivity, she also points out that gaps exist in the current knowledge base of the scientific community and points to areas where further investigation is needed. For example, Bergin acknowledges that although airshed model results for Los Angeles agree well with MIRs, such a study has not been conducted for other regions. Also, Bergin suggested that additional work is needed to examine the effects of aromatics under several different conditions, and that Eastern transport conditions should also be examined in a multi-day scenario. The RRWG is currently reviewing studies which examine the reactivities in the eastern half of the United States which will help to answer some of these questions.

Similarly, recent work by Martien and Harley found that ''[f]or most species studied'' * * * ''[r]eactivity scales developed by 3-D modeling resulted in similar rankings of individual VOC when compared to reactivity scales developed by Carter using a box model.'' [26] They also point out that ''[S]ite-to-site differences (in reactivity values) can be large when absolute reactivity scales are considered. The variation in reactivity across sites is reduced when reactivity is measured on a relative rather than absolute scale. Differences in relative reactivity may still occur as a function of location, with differences likely to be magnified where absolute reactivities are low.''

One study submitted by CARB to EPA attempts to address the issue of whether the MIR scale adequately represents VOC reactivity in transport scenarios. Kaduwela and his associates [27] assessed for the first time whether box-model based scales are applicable to regional-scale domains, which include transport of pollutants through urban and rural areas. They did this by conducting grid-based photochemical simulations in a regional domain in central California for five compounds and found a linear correlation between box-model based scales and regional grid-based scales. These studies indicate a correlation between box-model scales used in Carter's work and the more detailed scales. Therefore, CARB concludes that the box-model's lack of physical detail and shorter episode time does not limit the suitability of the MIR values with respect to concerns about transport within California.

During an October 1999 RSAC meeting, a member of the public asked the RSAC whether the scenarios used to calculate MIRs are realistic. The RSAC committee ''[r]esponded that the relative reactivity doesn't change between scenarios and that, in a study which examined an exposure metric calculated by a 3-D model, the relative reactivities correlated well with MIRs.'' [28] At the same meeting, a member of the public also asked the RSAC if MIR conditions were appropriate for California. The committee's response was that whether MIR conditions were appropriate for California was a policy decision. The CARB's SIP submittal states [29] that ''[w]hile the MIR scale has been extensively tested as appropriate for use in California, we caution that our research has focused on California atmospheric conditions only. As such, the suitability of using the MIR scale for regulatory purposes in other parts of the United States has not been demonstrated, and may not be appropriate.''

iii. Approach to Uncertainty. Although the MIR values are calculated with what a peer reviewed report [30] describes as a ''state-of-the-science'' chemical mechanism, the reactivity values of some VOCs are still uncertain,[31] while those of other VOCs have been more thoroughly studied and will not likely change with further research. To account for this uncertainty, CARB has applied Carter's uncertainty ranking which defines 6 categories or ''bins'' to describe the ''certainty'' of the chemical mechanism used to determine the MIR values. The uncertainty scale is subjective, but it is described as Carter's best judgment of the certainty scientists currently have of an organic compound's chemical

[22] W.P.L. Carter, ''Development of Ozone Reactivity Scales for Volatile Organic Compounds,'' J. Air Waste Manage. Assoc. 44:881–899, (1994).

[23] From Carter's article on ''Development of Ozone Reactivity Scales for Volatile Organic Compounds,'' the term ''base ROG mixture'' means the mixture of Reactive Organic Gases (ROGs) initially present or emitted in the Empirical Kinetic Modeling Approach (EKMA) scenarios except for biogenic VOCs, VOCs present aloft, or VOCs added for the purpose of calculating their incremental reactivities.

[24] M. Bergin, W.P.L. Carter, J. Milford, P.J. Ostrowski, A.G. Russell, Reactivity Assessments, Reactivity Research Working Group (May 5, 1999). (*ftp://ftp.cgenv.com/pub/downloads/RRWGdoc/assess-2.pdf*).

[25] M. Bergin, W.P.L. Carter, J. Milford, P.J. Ostrowski, A.G. Russell, Reactivity Assessments, Reactivity Research Working Group, Page 12, (May 5, 1999). (*ftp://ftp.cgenv.com/pub/downloads/RRWGdoc/assess-2.pdf*).

[26] P. Martien, R.Harley, ''Development of Reactivity Scales via 3-D Grid Modeling of California Ozone Episodes,'' Final report prepared for California Air Resources Board, May 2002.

[27] A. Kaduwela, V. Hughes, L. Woodlouse, P. Allen, J. DaMassa, A. Ranzieri, ''Photochemical Reactivity of Organic Compounds in Central California: A Grid-Based Modeling Study,'' Presented at Stanford University, CA July 26–28, 1999.

[28] Minutes of the Reactivity Scientific Advisory Committee, October 8, 1999, *http://www.arb.ca.gov/research/reactivity/rsac/oct99-min.html*.

[29] State Implementation Plan (SIP) Submittal letter from Michael Kenny (CARB) to Wayne Nastri (US EPA, Region IX), March 13, 2002.

[30] W.R. Stockwell, ''Review of the Updated Maximum Incremental Reactivity Scale of Dr. William Carter,'' Prepared for the California Air Resources Board, Page 151, November 29, 1999—A copy can be found in section 4N of CARB's SIP submittal for this rule.

[31] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Chapter II, Page 13, May 5, 2000.

reaction mechanism and its effect on that compound's estimated MIR value [32]. If the MIR value of a compound is relatively certain or if there are some uncertainties but the MIR value is not expected to change significantly, the compound is assigned to bin one. If the current mechanism is probably incorrect and biases in atmospheric reactivity predictions are uncertain, the compound is assigned to bin six. When calculating an equivalent ozone reduction, CARB identifies which of the 6 bins a compound is in, and then multiplies the compound's MIR value with a factor of between 1 and 2 to compensate for the uncertainty of that MIR value. The uncertainty factors associated with each bin were developed by CARB with input from Carter. The CARB applies an uncertainty factor of 1.0 to compounds classified within uncertainty bins one and two; a factor of 1.25 to compounds in bin three; a factor of 1.5 to compounds in bin four; and a factor of 2.0 for compounds in bins five and six. For certain hydrocarbon solvents defined under the regulation, CARB uses an uncertainty factor of 1.15. The CARB also developed a methodology for those compounds used in aerosol coatings that did not have published MIR values. The methodology, which was reviewed by the RSAC, provides an estimate for the presumed upper limit MIR value. No adjustment factor is applied to the upper limit MIRs as the method infers the highest reactivity of the chemical.[33]

Other researcher [34 35 36] looking into the aspects of uncertainties in chemical reaction rate parameters, used in the model to calculate MIRs, believe that the uncertainties in the chemical rate parameters have directionally similar effects on the reactivities of most compounds. That is, if compound ''a'' had a higher reactivity value than compound ''b,'' then after taking into account the uncertainties in their chemical rate parameters, compound ''a'' would generally still have a higher reactivity value than compound ''b.'' These researchers conclude that the significance of these uncertainties could be minimized by using reactivities in a relative sense, as CARB has done in this rule.

iv. Do Federal VOC exemptions apply to CARB's program?

Because CARB's regulation attempts to account for the actual contribution to ozone formation by each organic compound, it does not exempt any reactive compounds, including those that EPA has exempted from the definition of VOC pursuant to 40 CFR 51.100(s). In order to get a more accurate calculation of a product's impact on ozone formation, CARB uses the assigned reactivity value of each compound, however high or low its MIR value. Therefore, compounds such as acetone, which are excluded from EPA's definition of VOCs in 40 CFR 51.100(s), are counted towards the compliance limit under CARB's reactivity-based regulation.

v. No backsliding. In developing the proposed reactivity limits, one of CARB's goals was to ensure that the ozone reduction commitment from the existing mass-based VOC limits for aerosol spray coatings would not be compromised. In certain situations, however, a reactivity-based regulation could result in increased ozone concentrations over a traditional VOC mass-based regulation. For instance, because the MIR scale is based on a 1-day simulation, during a multi-day episode, a manufacturer could substitute the proper amount or too much of a lower reacting compound for a higher reacting one and thereby increase ozone formation over longer periods of time.

While we believe there are circumstances under which ozone formation could potentially increase because of use of reactivity-based VOC limits, we also recognize that the same unintended consequences can occur with current mass-based VOC rules. The CARB reported [37] that one company intended to comply with stricter CARB VOC mass-based limits by using less total VOC, but also by increasing the amount of much more reactive VOCs to compensate for solvency needs in the product. The CARB also reported that another large company indicated that its compliance strategy with more stringent VOC mass limits would be to increase the aromatic content (increasing reactivity) in its products. In these instances, CARB points out that the increased reactivity of the VOC emissions likely reduces the benefits of the lower mass of VOC emissions. There is no evidence to suggest, however, that regulated entities will always choose to use smaller amounts of higher reactivity compounds in place of lower reactivity compounds when a product's mass-based VOC limit is reduced. In any event, it is impossible to predict whether the use of smaller amounts of more reactive VOCs will result in more ozone without knowing how the identity and proportions of the other VOC ingredients in the product will change. While we acknowledge that there is the potential for this unintended consequence of mass-based controls, we generally believe that achieving significant mass reductions of VOCs is directionally correct in most situations. As noted above, however, EPA believes that reactivity-based approaches such as the one developed by CARB may be a promising alternative to mass-based approaches in some cases where additional VOC controls are necessary.

Revisions to the SIP should contribute to progress towards reaching attainment with the NAAQS and not relax emission standards or retreat from emission reduction goals already achieved. Towards these goals, CARB has assured EPA that there will be no backsliding as a result of the use of the relative reactivity approach. With assistance from CARB, EPA intends to monitor the effectiveness of the aerosol coatings rule to ensure that the rule obtains the intended and required reductions in ambient ozone levels.

2. Evaluation and Revision

The development, maintenance, evaluation, and revision of a reactivity-based VOC regulation requires significant resources and technical expertise. The CARB's commitment to the reactivity concept is evidenced by funding, between 1989 to the present, over $4,000,000 worth of research on reactivity related projects including modeling, chemical mechanism development, atmospheric chemistry and VOC speciation.

Similarly, we believe that additional resources and technical expertise are needed to implement and enforce a reactivity-based regulation than for a traditional mass-based regulation. For example, under a mass-based VOC regulation, analysis of a coating to

[32] W.R. Stockwell, ''Review of the Updated Maximum Incremental Reactivity Scale of Dr. William Carter,'' Prepared for the California Air Resources Board, Page 122, November 29, 1999—A copy can be found in section 4N of CARB's SIP submittal for this rule.

[33] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Chapter IV, pages 32–37, May 5, 2000.

[34] Y. Yang, W.R. Stockwell, J.B. Milford, ''Uncertainties in Incremental Reactivities of Volatile Organic Compounds,'' Environ. Sci. Technol., 29, 1336–1345, (1995).

[35] M.S. Bergin, A.G. Russell, J.B. Milford, ''Effects of Chemical Mechanism Uncertainties on the Reactivity Quantification of Volatile Organic Compounds Using a Three-Dimensional Air Quality Model,'' Environ. Sci. Technol., 32, 694–703, (1998).

[36] N.L. Kelly, T.Y. Chang, ''An experimental Investigation of Incremental Reactivities of Volatile Organic Compounds,'' Atmospheric Environment, 33, 2101–2110, (1999).

[37] California Air Resources Board letter from Michael Kenny to Deborah Jordan, U.S. EPA, Region IX, dated July 24, 2000.

determine compliance largely requires simply determining the weight difference of a sample before and after heating it in an oven [38]. This testing is relatively easy and inexpensive, thereby facilitating enforcement by the regulating authority or others.

In contrast, determining compliance of the same product with a reactivity-based regulation is more complex and consequently more expensive. Here, the laboratory needs to identify and quantify each individual VOC present in the sample, possibly with multiple gas chromatography with mass spectrometry (GC/MS) runs. In order to determine compliance, the regulatory agency then must multiply the concentration of each compound in the aerosol coating by its MIR value and then sum the results to determine the product's total MIR value. In some cases, the MIR values for isomers of compounds are different, such as for ortho, meta and para xylenes (MIR = 7.49, 10.61, and 4.25 respectively). Speciation of isomers increases the complexity of the analysis. In addition, the identification of hydrocarbon solvents by boiling point range and aromatic content will add an additional step to the analysis. The CARB laboratory staff routinely uses GC/MS techniques to analyze products for a relatively small number of compounds excluded from EPA's regulatory definition of VOC which may be in consumer products, so CARB has some experience with these analytical techniques. Further, CARB is ''[f]ully prepared to vigorously enforce this regulation'' and their ''[e]nforcement inspectors and laboratory staff have expertise and resources to collect and test aerosol coating products to verify compliance with the regulation.'' [39]

Because any complex regulation can potentially multiply the opportunities for non-compliance, whether intentional or inadvertent, EPA believes that an intensive program to monitor and enforce compliance is a critical element to any VOC reactivity-based regulation.

D. Are California's Relative Reactivity-Based Regulations Appropriate for Areas Outside of California?

1. The CARB's technical support for this program in California does not necessarily demonstrate that VOC reactivity-based programs would be appropriate or effective in other areas or for other regulatory programs. The CARB's SIP submittal cautions that its research has focused only on California atmospheric conditions and that the suitability of the MIR scale for regulatory purposes in other areas has not been demonstrated. The CARB further states [40] that VOC relative ''[r]eactivity needs to be examined for the rest of the country.'' and that they ''[s]upport these investigations and plan to continue CARB's participation in the RRWG.''

EPA is aware that only recently has there been published, coordinated scientific research to attempt to address questions concerning the use of VOC reactivity-based regulations in other locations. For example, a recent NARSTO report describes limitations to ozone control using a VOC reactivity-based approach. The NARSTO report suggested that the approach might only be effective when the ambient conditions are ''[V]OC limited and where natural hydrocarbon emissions are not dominant.'' [41] In addition, the NARSTO report states that ''[t]he reactivity of specific VOCs can change from locale to locale, and thus the specifics of the approach must be regionally tailored.'' As noted earlier, the RRWG has sponsored a series of recent studies exploring these issues.

One of the concerns with the representativeness of MIR values is that they are based on a model which simulates reactions over a single day and may not account for slower reacting compounds which might continue to form ozone over several days. These slower reactions could result in more ozone formation than is predicted by the MIR scale in areas experiencing multi-day stagnation events or increased ozone formation in downwind areas due to pollutant transport.

The MIR scale is basically a reduced-form model, or a model of a model, which attempts to characterize in a single number the relative contribution of individual compounds to the formation and accumulation of ozone in a complex atmospheric system. Thus, a particular chemical mechanism and set of assumed environmental conditions are implicit in the MIR scale. The purpose of comparing the MIR scale to reactivities calculated using an airshed model is to evaluate whether the MIR scale, as a reduced-form model, adequately represents the behavior of the more complex airshed model, which takes into account spatially and temporally varying meteorology and emissions. If comparisons show a disagreement between the MIR values and the airshed derived values, that may suggest that it may not be appropriate to try to capture the behavior of the system in the single scale. If comparisons do show an agreement, this would suggest that the MIR scale can reproduce the behavior of the complex system, at least for the set of conditions considered.

Several researchers have performed such comparisons, including Bergin, Derwent and Stockwell. Bergin *et al.*,[42] calculated reactivity values using a more detailed three-dimensional photochemical model and compared their results against the values calculated by the simpler model used to develop CARB's reactivity program for their alternative fuels program. Bergin found that results were well correlated between Carter's simpler model and their more detailed model. However, these researchers also found that toluene, ethylbenzene, two xylene species, and some aldehydes had lower reactivity values predicted by the more detailed model as compared to the simpler model. Bergin concluded that differences in the predicted reactivity values were possibly due to multi-day simulation periods and the inclusion of cloud cover by the more detailed model.

Derwent [43] also reports that single-day or multi-day conditions appear to be important in establishing quantitative reactivity scales for the less reactive organic compounds. Stockwell,[44] who completed the peer review of Carter's reactivity mechanism, states that single-day scenarios are used to calculate incremental reactivities by definition, but even relatively unreactive organic compounds may have a non-negligible effect on ozone concentrations if multiple-day scenarios are considered. When he calculated incremental reactivities for multiple-days for polluted European conditions, he found that ethane's MIR value increased over 6 times from a MIR value of 0.19 on the first day to 1.17 on the 6th day. He also found that Dimethyoxymethane's MIR

[38] *See* 40 CFR 60, appendix A Reference Method 24.

[39] State Implementation Plan submittal letter from Michael Kenny (CARB) to Wayne Nastri (U.S. EPA, Region IX), March 13, 2002.

[40] State Implementation Plan Submittal letter from Michael Kenny (CARB) to Wayne Nastri (US EPA Region IX), March 13, 2002.

[41] The NARSTO, An Assessment of Tropospheric Ozone Pollution—A North American Perspective, page 3–19, July 2000.

[42] M.S. Bergin, A.G. Russell, J.B. Milford, ''Quantification of Individual VOC Reactivities Using a Chemically Detailed, Three-Dimensional Photochemical Model,'' Environ. Sci. Technol., 29, 3029–3037, (1995).

[43] R.G. Derwent, M.E. Jenkin, S.M. Saunders, M.J. Pilling, ''Characterization of the Reactivities of Volatile Organic Compounds Using a Master Chemical Mechanism,'' J. Air and Waste Manage. Assoc., 51, 699–707, (2001).

[44] W.R. Stockwell, H. Geiger, K.H. Becker, ''Estimation of Incremental Reactivities for Multiple Day Scenarios: An Application to Ethane and Dimethyoxymethane,'' Atmospheric Environment, 35, 929–939, (2001).

value increased as the length of the simulation period increased.

While we are uncertain whether results based on European conditions might generally apply to conditions found in California or the United States, these studies raise two questions. First, is the increase in MIR values during a multi-day stagnation event mainly a concern for slower reacting compounds or a more widespread issue, and second, should any changes be made to MIR scale values to account for the apparent increases in reactivity values in multi-day stagnation scenarios. Additional research may be needed in this area to understand more fully the impacts of multi-day scenarios on relative reactivity values and the prevalence of transport and multi-day stagnation conditions on a regional scale within California's ozone nonattainment areas and ozone nonattainment areas in other parts of the country. While we have some concerns about the greater level of effort required to develop, implement, and enforce reactivity-based programs, we believe that California has the resources and technical expertise needed to develop and maintain a complex program such as this one.

E. How Will the Effectiveness of This Reactivity-Based Program Be Evaluated?

1. We plan to evaluate the effectiveness of the aerosol coatings rule in 3 years. Areas we may review include changes in the composition and quantity of VOC emissions, which would require establishing a baseline of current emissions.

2. We are also interested in evaluating changes in ambient air quality that result from the use of the relative reactivity approach in this rule. We recognize that currently available computer models have limitations in their ability to evaluate the actual ambient effects of reducing emissions of specific VOC species from a particular product category. Also, while it is possible to show an air quality benefit of substituting individual VOCs with lower reactivity for more reactive ones using a three-dimensional photochemical model, it is not clear that current photochemical modeling systems are adequate to predict the impacts of the wide variety of simultaneous substitutions that may occur under an MIR-weighted regulatory program. The EPA, with CARB's assistance, plans to investigate possible modeling enhancements to evaluate the effects of the aerosol coatings rule, and hopes to identify modeling ''experiments'' to further test the MIR's predictive performance.

While a VOC reactivity-based regulation may result in a more efficient regulation in terms of more flexible reformulation options for manufacturers and an additional control strategy to reduce tropospheric ozone, we are also interested in how costs under a reactivity-based regulation might change for monitoring and recordkeeping. Under a reactivity-based program, emission inventory efforts may increase for industry periodically to provide fully speciated product information and for regulatory agencies to input this information into emission inventory data bases. We are interested in the public's comment on how the industry's and regulatory agency's costs and staff requirements might change with respect to emission inventories.

3. As stated earlier, CARB intends to keep up to date on VOC reactivity research through a review of the MIR values every 18 months and a review of the reactivity limits before January 1, 2007.

F. How Has CARB Addressed Concerns About Air Toxics and Ozone-Depleting Substances?

The CARB's aerosol coatings regulation prohibits the use of three toxic air contaminants: Methylene chloride, perchloroethylene and trichloroethylene. While the regulation does not ban the use of other compounds listed as ''hazardous air pollutants'' that are commonly used in aerosol coatings such as xylene and toluene, CARB believes that emissions of these other toxic compounds are likely to be reduced through the overall emission limits imposed on the individual product categories. Regulated entities will have an incentive to use less of compounds like toluene and xylene because of their higher reactivity, and this will outweigh the interest in choosing VOCs based solely upon their cost.

The CARB's regulation also prohibits the sale, supply, application, or manufacture for use in California, of any aerosol coating product which contains a stratospheric ozone-depleting substance. Existing product formulations which contain an ozone-depleting substance that complies with the reactivity limits and was sold in California during 1997 or product formulations containing an ozone-depleting substance that was sold in California during 1997 that is reformulated to meet the reactivity limits, as long as the content of the ozone-depleting substances in the reformulated product does not increase, are exempted from this provision.

G. What Changes in Enforcement Strategies Will Likely Occur Due to This Relative Reactivity-Based Regulation?

1. How will testing for compliance change under CARB's aerosol coatings regulation? As discussed earlier, under a traditional mass-based regulation, analysis of a coating to determine compliance is performed using EPA Reference Method 24.[45] This method involves heating the sample in an oven and determining the weight difference of the sample before and after heating. Additional analysis is needed to account for the propellant and, if present in the sample, compounds which are excluded from EPA's definition of VOCs. Under a mass-based rule, the laboratory does not need to know which individual hydrocarbons are present in order to perform Method 24, other than to identify if a limited number of excluded compounds are present in the coating. Manufacturers are generally willing to reveal the proportions of exempt substances because that helps to demonstrate compliance with the mass-based VOC limits.

Determining compliance under a reactivity-based regulation is more complex, but still within the capabilities of CARB's laboratory. Specifically, the regulator must perform expensive and complex GC/MS analysis to identify and quantify each VOC present in the product in order to calculate the product weighted MIR. To facilitate this compliance determination, CARB's aerosol coatings rule allows CARB to request manufacturers to provide a listing of the VOCs and their concentrations in each product so the laboratory knows which VOCs to analyze for and their target concentrations. While laboratories could perform the analysis without such a listing, it would be substantially more difficult, time-consuming, and expensive. This increased difficulty in assuring compliance is among the reasons that EPA is concerned that CARB allocate sufficient resources to monitor and enforce the reactivity-based limits.

2. How does a reactivity regulation affect the availability of emissions data? In the past, determining compliance with emission limits under a mass-based VOC rule such as CARB's aerosol coatings rule did not raise concerns about confidential business information (CBI) because one could determine compliance with the product's VOC limit without ever having to know all of the individual VOC ingredients present

[45] See 40 CFR 60, appendix A, Reference Method 24.

in the product. However, under a reactivity-based rule, one would need to know the specific VOCs in a product and their proportions (*i.e.,* the product formulation) in order to determine compliance with its reactivity-based VOC limit. Because this information is an integral part of determining compliance with the product's reactivity-based limit, the list of VOCs would be considered ''emissions data,'' which must generally be available to the public.[46] However, industry may view the release of such detailed VOC information to the general public or to their business competitors as a major concern because of the potential for release of trade secrets and propriety CBI.

To help resolve these competing issues, we note that aerosol coatings are composed of a VOC portion and a portion made up of various non-reactive compounds such as resins and solids which, based on CARB's aerosol coatings regulation, do not contribute to ozone formation and are assigned an MIR value of zero. Consistent with section 114(c) of the CAA, and our regulations concerning the release of emissions data at 40 CFR § 2.301, we believe the public's right to emissions data is satisfied by assuring access to the portion of the data which comprises the VOCs alone. Information on the non-reactive compounds, *i.e.,* those that do not contribute to ozone formation, would not need to be released, thereby preserving potential trade secrets.

The CARB and the aerosol coatings industry held discussions and reached an agreement that CARB VOC testing results and company-supplied formulation data required to be submitted by Section 94526 of CARB's aerosol coatings regulation would be made available to the public, upon request, to allow others to verify compliance with the reactivity-based aerosol coating regulation. It was further agreed that non-reactive compounds in each product formulation would be ''lumped'' or aggregated to protect confidentiality.[47]

Both CARB and EPA will retain their authority to access all ingredient information, including non-VOC ingredients or information otherwise claimed to be CBI, in order to determine compliance with the regulation.

The availability to the public of VOC ingredient information constituting emissions data only applies to information gathered to confirm compliance with CARB's aerosol coatings rule. Confidential information such as survey data submitted by companies under Section 94524 of CARB's aerosol coatings regulation to CARB and EPA in support of any future rule development efforts, will continue to be handled in accordance with applicable CBI regulations.

We believe that this compromise between the competing objectives of disclosure of emissions data and protection of CBI provides a basis for approving CARB's innovative reactivity-based regulation into the SIP. We also believe that the compromise is consistent with the purpose of CAA § 114(c) and EPA's regulations defining emissions data.

IV. Summary of CARB's Aerosol Coatings Regulation

A. What Does CARB's Regulation Require?

The CARB has previously controlled VOC emissions from aerosol coatings in California by limiting the mass of VOCs in the product, with limits expressed as maximum allowable percent by mass of VOC. CARB's new approach relies on the fact that individual VOCs may form different amounts of ozone, or form ozone more quickly, once they are emitted into the air. The CARB is implementing a regulation that would limit ozone formation by taking into account the relative reactivity of different VOC ingredients.

The CARB's aerosol coatings regulation contains sections on applicability, definitions, limits and requirements, exemptions, administrative requirements, variances, test methods, Federal enforceability and references tables of MIR values for different compounds including hydrocarbon solvents.

1. What Does CARB's Aerosol Coatings Regulation Cover?

This section contains a very brief summary of key portions of CARB's regulation. The reader should refer to the actual regulation[48] for additional details.

The regulation applies to aerosol coatings, aerosol clear coatings and aerosol stains. It applies to any person who sells, supplies, offers for sale, applies or manufactures for use in California any aerosol coating subject to the limits in the regulation. The regulation prohibits the commercial application of non-complying aerosol coating products.

The regulation does not apply to aerosol lubricants, mold releases, automotive underbody coatings, electrical coatings, cleaners, belt dressings, anti-static sprays, layout fluids and removers, adhesives, maskants, rust converters, dyes, inks, and leather preservatives or cleaners. The regulation also does not apply to aerosol coating products manufactured in California for shipment and use outside of California.

Aerosol coating products manufactured beginning June 1, 2002, for general coating categories as defined in the regulation and January 1, 2003, for specialty coatings need to comply with the reactivity-based VOC limits specified in the regulation. Aerosol products manufactured before the effective dates must comply with the existing mass-based VOC limits. However, products labeled with the applicable reactivity-based VOC limit, must meet that limit. The regulation contains a sell-through provision whereby products manufactured prior to the effective date can be sold, supplied, offered for sale, or applied up to 3 years after the effective date.

The regulation prohibits the use of the toxic air contaminates methylene chloride, trichloroethylene, and perchloroethylene. It also prohibits the use of stratospheric ozone-depleting substances in aerosol coating products except in limited situations allowed by the regulation.

The regulation contains labeling and reporting requirements, and provisions for a regulated entity to request a variance from the VOC reactivity limits if the entity cannot comply due to extraordinary reasons beyond reasonable control. The test method section specifies that CARB Method 310 is to be used to determine compliance with the regulation. Alternative test methods may be used which are shown to identify and quantify accurately each ingredient, after approval in writing by the CARB Executive Officer. However, as stated in the aerosol coatings regulation,[49] for purposes of Federal enforceability, EPA is not bound by approval determinations made by the CARB Executive Officer for variances or test methods. While EPA believes CARB would not approve major test method modifications that might compromise the integrity of a test result, or grant a variance request that would adversely

[46] Emissions data is defined in 40 CFR 2.301(a)(2)(i).

[47] The CARB letter from Michael Kenny to Jack Broadbent, U.S. EPA, Region IX, dated May 16, 2002.

[48] *http://www.arb.ca.gov/consprod/regs/aeropnt.pdf http://www.arb.ca.gov/consprod/regs/Aeropnt.doc* or California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Article 3.

[49] California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Article 3, § 94528.

impact an approved attainment demonstration, EPA can pursue separate action to ensure that test results are enforceable, accurate, and reproducible, and that a variance does not adversely impact attainment.

Variances and major modifications to test methods must be submitted to EPA and must be approved into the SIP before they can be Federally enforceable. For the purposes of Federal enforceability, facilities operating under a variance or modified test method approved by the CARB Executive Officer must continue to comply with the original regulation until the variance or major test method modification is also approved by EPA into the SIP. The EPA does not normally approve Executive Officer discretion in regulations submitted for SIP approval as this would allow potentially significant modifications to a regulation or test method without subsequent review and approval by EPA.

We are proposing to approve this Executive Officer provision in this rule because this is a new and innovative program and, as such, may require a temporary variance or an unanticipated modification to the test method in the short term, and the regulation states that EPA is not bound by the decisions of the Executive Officer. The EPA intends to monitor CARB's implementation of these rule provisions and we will review test method modifications and variance requests on a case-by-base basis.

V. Future Actions

A. What Action Will Be Taken To Determine if This Reactivity-Based Regulation Is Effective?

The EPA will continue to work with CARB to evaluate how VOC emissions from this source category change in response to the regulation and how these emission changes will affect ambient air quality. We will also continue to work with CARB to evaluate the appropriateness of MIR values for VOC reactivity ranking under the environmental conditions of interest in California. The EPA's proposed approval of CARB's aerosol coatings regulation is predicated, in part, on CARB's commitment to ensuring that the regulation in fact achieves the intended environmental goals. The CARB's SIP submittal letter [50] states that CARB officials ''[i]ntend to follow the implementation of this regulation closely to ensure the air quality benefits predicted are fully achieved. If they are not, CARB is obligated to identify and secure additional regulatory measures to meet our SIP commitments.'' ''[M]oreover, if in fact the aerosol coating regulation is not as effective as predicted, we are fully prepared to reevaluate the source category to determine how best to achieve the most stringent limits that are technologically and commercially feasible.''

B. How Will Future Uses of Relative Reactivity Be Evaluated?

The CARB views the aerosol coatings rule as a means to determine the feasibility of additional reactivity-based measures for other source categories.[51] The EPA is working as a participant in the RRWG to explore whether reactivity-based approaches are appropriate and useful for other source categories and in other parts of the country. Members of the RRWG have a variety of research projects underway to provide needed information about the utility and effectiveness of relative reactivity-based VOC controls. The EPA is committed to the process begun under the RRWG of assuring that future applications of the relative reactivity approaches are based on a sound scientific foundation and are practical, enforceable, and effective.

VI. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866, (58 FR 51735, October 4, 1993) the Agency must determine whether the regulatory action is ''significant'' and therefore subject to the Office of Management and Budget (OMB) review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

For the change in definition of VOCs, EPA has determined that this proposed rule is not a ''significant regulatory action'' under the terms of Executive Order 12866 and is therefore not subject to OMB review. For the proposed approval of CARB's rule into the SIP, OMB has exempted this regulatory action from Executive Order 12866 review.

B. Paperwork Reduction Act

For the change in the definition of VOCs, this proposed rule does not contain any information collection requirements subject to OMB review under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*

For the proposed approval of CARB's regulation into the SIP, this proposed action does not contain any information collection requirements that would require any person to provide information to EPA, however CARB's regulation contains requirements for the aerosol coating industry to provide information to CARB.

C. Regulatory Flexibility Act (RFA)

The 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.

After considering the economic impacts of today's proposed rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities.

This proposed rule will not impose any requirements on small entities. Today's change to the definition of VOC does not directly regulate any entities. The RFA analysis does not consider impacts on entities which the action in question does not regulate. *See Motor & Equipment Manufacturers Ass'n* v. *Nichols,* 142 F. 3d 449, 467 (D.C. Cir. 1998); *United Distribution Cos.* v. *FERC,* 88 F. 3d 1105, 1170 (D.C. Cir. 1996), cert. denied, 520 U.S. 1224 (1997).

For the proposed approval of CARB's regulation into the SIP, this proposed rule will not have a significant impact on a substantial number of small entities because SIP approvals under section 110 and subchapter I, part D of the CAA

[50] SIP submittal letter from Michael Kenny (CARB) to Wayne Nastri (U.S. EPA, Region IX), March 13, 2002.

[51] California Air Resources Board, ''Initial Statement of Reasons for the Proposed Amendments to the Regulation for Reducing Volatile Organic Compound Emissions from Aerosol Coating Products,'' Chapter II, page 18, May 5, 2000.

do not create any new requirements but simply act on requirements that the State is already imposing. Therefore, because the Federal SIP approval does not create any new requirements, I certify that this action will not have a significant economic impact on a substantial number of small entities.

Moreover, due to the nature of the Federal-State relationship under the CAA, preparation of flexibility analysis would constitute Federal inquiry into the economic reasonableness of State action. The CAA forbids EPA to base its actions concerning SIPs on such grounds. *Union Electric Co.* v. *U.S. EPA,* 427 U.S. 246, 255–66 (1976); 42 U.S.C. 7410(a)(2).

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 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 by State, local, and tribal governments, in the aggregate, or the private sector, of $100 million or more in any 1 year. Before promulgating an EPA rule for which a written statement is needed, section 205 of 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 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.

For the proposed change in the definition of VOCs, today's rulemaking contains no Federal mandates (under the regulatory provisions of title II of the UMRA) for State, local, or tribal governments or the private sector.

For the proposed approval of CARB's regulation into the SIP, EPA has determined that the proposed approval action does not include a Federal mandate that may result in estimated costs of $100 million or more to either State, local, or tribal governments in the aggregate, or to the private sector. This Federal action proposes to approve pre-existing requirements under State or local law, and imposes no new requirements. Accordingly, no additional costs to State, local, or tribal governments, or to the private sector, result from this action.

Thus, today's rule is not subject to the requirements of sections 202 and 205 of UMRA.

In addition, EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments in accordance with 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 Executive Order 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.''

This proposed rule does not have federalism implications. It will 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 Executive Order 13132. Today's proposed rule does not impose any new mandates on State or local governments. The change to the definition of VOCs merely assists CARB in implementing its aerosol coatings reactivity regulation. The proposed approval of this regulation into the SIP acts on a State regulation implementing a Federal standard, and does not alter the relationship or the distribution of power and responsibilities established in the CAA. Thus, Executive Order 13132 does not apply to this rule.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comment on this proposed rule from State and local officials.

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

Executive Order 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.'' This proposed rule does not have tribal implications, as specified in Executive Order 13175. The proposed change to the definition of VOCs merely assists CARB in implementing its aerosol coatings reactivity regulation and does not impose any direct compliance costs. The proposed approval of CARB's regulation into the SIP acts on a State regulation and does not alter the relationship between the Federal government and Indian Tribes, as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to this rule. The EPA specifically solicits additional comment on this proposed rule from tribal officials.

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 Executive Order 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, the Agency must 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.

While this proposed rule is not subject to the Executive Order because it is not economically significant as defined in Executive Order 12866, we have reason to believe that ozone has a disproportionate effect on active children who play outdoors. (See 62 FR 38856 and 38859 July 18, 1997). However, we do not expect today's proposed approval of CARB's regulation into the SIP to result in an adverse

impact, as it is intended to be an ozone neutral action. The CARB has indicated that they have designed their new reactivity-based limits to achieve the same ozone reductions as the mass-based limits they supplant. Also, we do not expect today's proposed change to the definition of VOC to result in any adverse impact, because it increases the number of compounds subject to regulation as VOCs for the purpose of California's aerosol coatings reactivity-based regulation.

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

This rule is not subject to Executive Order 13211, ''Actions That Significantly Affect Energy Supply, Distribution, or Use'' (66 FR 28355, May 22, 2001) because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer Advancement Act

Section 12(d) of the National Technology Transfer Advancement Act of 1995 (''NTTAA''), Public Law No. 104–113, § 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.*, materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

For the change in definition of VOCs, this proposed rulemaking does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards. For the proposed approval of CARB's regulation into the SIP, the State regulation references standard test methods and makes modifications to American Society for Testing and Materials (ASTM) D3074–94, D3063–94 and D2879–97 to support the regulatory objectives.

The EPA welcomes comments on this aspect of the proposed rulemaking and, specifically, invites the public to identify potentially-applicable voluntary consensus standards and to explain why such standards should be used in this regulation.

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 52

Environmental protection, Air pollution control, Intergovernmental relations, Ozone, Reporting and recordkeeping requirements, Volatile organic compound.

Authority: 42 U.S.C. 7401 *et seq.*

Dated: December 29, 2004.

Michael O. Leavitt,

Administrator.

PART 51—REQUIREMENTS FOR PREPARATION, ADOPTION, AND SUBMITTAL OF IMPLEMENTATION PLANS.

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

Authority: 42 U.S.C. 7401, 7411, 7412, 7413, 7414, 7470–7479, 7501–7508, 7601, and 7602.

2. Section 51.100 is proposed to be amended by adding paragraph (s)(6) as follows:

§ 51.100 Definitions.

* * * * *

(s) * * *

(6) For the purposes of determining compliance with California's aerosol coatings reactivity-based regulation, (as described in the California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Article 3), any organic compound in the volatile portion of an aerosol coating is counted towards that product's reactivity-based limit. Therefore, the compounds identified in this section [*i.e.*, §51.100 (s)] as negligibly reactive and excluded from EPA's definition of VOCs are to be counted towards a product's reactivity limit for the purposes of determining compliance with California's aerosol coatings reactivity-based regulation.

* * * * *

[FR Doc. 05–346 Filed 1–6–05; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 51 and 52

[OAR–2003–0200; FRL–7966–2]

RIN 2060–AM98

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

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The EPA is finalizing approval of a new consumer products regulation as part of the California State Implementation Plan (SIP) for ozone under the Clean Air Act (CAA) as amended in 1990. This California regulation adopts a new approach to reducing ozone formation from volatile organic compounds (VOC) in aerosol coating products. The EPA is also approving the use of California's Tables of Maximum Incremental Reactivity (MIR) to allow implementation of their rule. This action also revises EPA's definition of VOCs so that compounds which we previously identified as negligibly reactive and exempt from EPA's regulatory definition of VOCs now count towards a product's reactivity-based VOC limit for the purpose of California's aerosol coatings regulation. These revisions were previously proposed in the **Federal Register** on January 7, 2005 (70 FR 1640) and are expected to help in California's efforts to attain the National Ambient Air Quality Standards (NAAQS) for ozone.

DATES: This final rule is effective on October 13, 2005.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. OAR–2003–0200. All documents in the docket are listed in the EDOCKET index at *http://www.epa.gov/edocket.* Although listed in the index, some information is not publicly available, *i.e.*, Confidential Business Information (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 in EDOCKET or in hard copy at the Revisions to the California State Implementation Plan Docket, Docket ID No. OAR–2003–0200, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. 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) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Stanley Tong, Rulemaking Office, (AIR–4), Environmental Protection Agency, Region IX, 75 Hawthorne St., San Francisco, CA 94105; telephone number: (415) 947–4122; fax number: (415) 947–3579; e-mail address: *tong.stanley@epa.gov.*

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does This Action Apply to Me?

This action applies to persons that sell, supply, offer for sale, apply, or manufacture for use in California, any aerosol coating, aerosol clear coating and aerosol stain product subject to the limits in California's Aerosol Coating Products regulation. The regulation prohibits the commercial application of non-complying aerosol coating products.

B. Throughout This Document, "We," "Us" and "Our" Refer to EPA

C. Submitted Regulations

On January 7, 2005 (70 FR 1640), EPA proposed to approve the following regulations into the California SIP.

TABLE 1.—SUBMITTED REGULATIONS

Regulation title	Adopted	Submitted
Aerosol Coating Products	5/1/2001	3/13/2002
Tables of Maximum Incremental Reactivities (MIR) Values	5/1/2001	3/13/2002

We proposed to approve these regulations because we determined that they complied with the relevant CAA requirements. We also proposed to change our definition of VOCs so that compounds which we previously identified as negligibly reactive and exempt from EPA's regulatory definition of VOCs will now count towards a product's reactivity-based VOC limit for the purpose of California's aerosol coatings regulation. The January 7, 2005 proposed action contains more information on the California Air Resources Board's (CARB's) regulations and our evaluation.

D. Outline

The information in this preamble is organized as follows:

I. Background Information
A. What is Photochemical Reactivity?
B. What Does CARB's Regulation Do?
II. Response to Major Comments
A. Comments Supporting the Proposed Approval
B. Response to Questions Posed by EPA in the Proposal
C. Comments Asking EPA to Update and Expand its Reactivity Policy
III. Final Action
IV. Statutory and Executive Order Reviews

I. Background Information

A. What Is Photochemical Reactivity?

There are thousands of individual species of VOC chemicals that can combine with nitrogen oxides (NO_X) and the energy from sunlight to form ozone. The impact of a given VOC on formation of ground-level ozone is sometimes referred to as its "reactivity." It is generally understood that not all VOCs are equal in their effects on ground-level ozone formation. Some VOCs react extremely slowly and changes in their emissions have limited effects on ozone pollution episodes. Some VOCs form ozone more quickly, or they may form more ozone than other VOCs. Others not only form ozone themselves, but also enhance ozone formation from other VOCs. By distinguishing between more reactive and less reactive VOCs, however, it should be possible to decrease ozone concentrations further or more efficiently than by controlling all VOCs equally.

Assigning a value to the reactivity of a compound 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. The reactivity of a single compound varies with VOC–NO_X ratios, meteorological conditions, the mix of other VOCs in the atmosphere, and the time interval of interest. Designing an effective regulation that takes account of these interactions is difficult, and implementing and enforcing such a regulation carries the extra burden of characterizing and tracking the full chemical composition of VOC emissions. The January 7, 2005 proposal (70 FR 1640) contains additional background information on photochemical reactivity. Recently, EPA has issued guidance to States regarding the use of VOC reactivity information in the development of ozone control measures. This guidance is published elsewhere in today's **Federal Register**.

B. What Does CARB's Regulation Do?

The CARB has been exploring the use of reactivity-based regulations since the early 1990s as a means of achieving further ozone reductions. For example, in 1991, the CARB incorporated a reactivity scale for weighting vehicle emissions of individual VOC species in their low emitting vehicle and clean fuels regulation. In 2001, the CARB adopted an aerosol coatings regulation [1] that set reactivity-based VOC limits for six general coating categories and 29 speciality coating categories. The reactivity-based limits for the general coatings took effect on June 1, 2002 and the limits for the speciality coatings took effect on January 1, 2003. The CARB had previously controlled VOC emissions from aerosol coatings in California by limiting the mass of VOCs in the product, with limits expressed as maximum allowable percent of mass of VOC. The CARB's new approach incorporates the concept of VOC photochemical reactivity. This concept relies on the fact that the same weight/amount of some VOCs (*e.g.*, xylene) has the potential to form more ozone, or to form ozone more quickly, than the same weight/amount of other VOCs (*e.g.*, propane) once they are emitted into the ambient air under the same conditions. The EPA's action to approve CARB's regulation into the SIP enables CARB to include the ozone reductions achieved by their aerosol coatings regulation into their State SIP plan.

The CARB's aerosol coatings regulation applies to aerosol coatings, aerosol clear coatings and aerosol stains. It applies to any person who sells, supplies, offers for sale, applies or manufactures for use in California any aerosol coating subject to the limits in the regulation. The regulation prohibits the commercial application of non-complying aerosol coating products.

All aerosol coating products covered by the CARB's regulation were required to meet the new reactivity-based limits by January 1, 2003. The regulation contains a sell-through provision whereby products manufactured prior to the effective date of the regulation could be sold, supplied, offered for sale, or applied up to 3 years after that date.

The CARB believes that some VOC mass-based limits in the previous version of their rule presented particularly difficult reformulation challenges for manufacturers of water-based coatings, and the State concluded that it may not be feasible to achieve additional VOC reductions from a traditional VOC mass-based program. The CARB hopes to target VOC emissions reductions to better control a product's contribution to ozone formation by encouraging reductions of higher reactivity VOCs, rather than by treating all VOCs in a product alike through a mass-based rule. The submitted regulation, therefore, consists of reactivity-based limits that replace the existing mass-based VOC limits for aerosol spray coatings.

To discriminate among VOCs, the CARB has used a version of the MIR scale (W. P. L. Carter, ''Development of Ozone Reactivity Scales for Volatile Organic Compounds,'' Journal of the Air and Waste Management Association, 44, p.881–899, July 1994.) The MIR scale is designed using certain assumptions about meteorological and environmental conditions where ozone production is most sensitive to changes in hydrocarbon emissions and, therefore, is intended to represent conditions where VOC emission controls will be most effective. The MIR scale is expressed as grams of ozone formed per gram of organic compound reacted. Each compound is assigned an individual MIR value, which enables the reactivities of different compounds to be compared quantitatively. Individual MIR values now exist for many commonly used compounds, and a list of these individual values comprises a scale. Today's action approves into the SIP, the CARB's reactivity-weighted emission limits and the associated MIR scale.

The EPA believes that reactivity-based approaches such as the one developed by the CARB can be more efficient and effective than traditional approaches that do not distinguish among VOCs based on reactivity. In particular, reactivity-based approaches may be useful in areas where significant VOC emission controls are already in place and further mass-based emissions reductions may be difficult or very expensive to achieve. In such situations, regulations that distinguish between individual VOCs and create an incentive to shift production and use from more reactive VOCs to less reactive VOCs may provide the flexibility necessary to continue progress towards attainment of the ozone NAAQS.

To support the CARB's aerosol coating reactivity-based program, EPA is modifying our regulatory definition of VOC under 40 CFR 51.100(s) so that compounds previously excluded from the definition of VOC will now be counted towards a product's reactivity-based VOC limit for the limited purpose of the CARB's regulation.

II. Response to Major Comments

In our proposal to approve the CARB's aerosol coatings reactivity-based regulation and associated MIR tables into the SIP, and to change our definition of VOC, EPA indicated that interested parties could request that EPA hold a public hearing on the proposed action. The EPA received no requests for a public hearing.

The EPA also provided for a 60-day public comment period in the proposal. We received six comment letters. One letter was submitted from a regulatory agency and five letters were submitted from industry and trade associations. The major comments fell into 3 categories: (1) Comments supporting the proposed approval, (2) Response to questions posed by EPA in the proposal, and (3) Comments asking EPA to update and expand its reactivity policy. All comment letters are contained in the docket (OAR–2003–0200) for this action. In today's final action, we have summarized the significant comments and provided the Agency's responses.

A. Comments Supporting the Proposed Approval

Comment: All six comment letters supported the approval of the CARB's reactivity-based regulation into the SIP.

One commenter (84–1–2) stated that reactivity-based regulations for consumer products, where technologically feasible, were a more effective form of regulation. Another commenter (87–2–4) stated the approval provided the aerosol coatings industry with a relatively stable and reliable regulatory arena at least in the State of California and further indicated (87–2–5) that the CARB had already taken steps to make sure the reactivity-based regulatory program remained enforceable and scientifically accurate by updating the MIR tables in December 2003.

Response: This final rulemaking approves the CARB's aerosol coatings reactivity-based regulation into the SIP.

B. Response to Questions Posed by EPA in the Proposal

The EPA requested comments on the following areas in the proposed rule: how reactivity-based programs might affect industry compliance (*e.g.*, compliance testing) and recordkeeping costs; and how industry and regulatory agency costs and staff requirements might change with respect to detailed emission inventories, manufacturing or material costs, product quality and price.

Comment: Two commenters (82–2–1) and (85–3–4) stated the MIR concept

[1] *http:www.arb.ca.gov/colsprod/reg/apt.pdf* or Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8.5, Article 3.

allows formulators greater flexibility and cost effectiveness in meeting regulatory requirements, and that the simplicity of determining MIR values for hydrocarbon solvents creates the incentive for the substitution and use of solvents with relatively low contribution to ozone formation in aerosol coating applications.

One commenter (85–2–5) stated that reactivity-based regulations in general do not present significant or insurmountable problems regarding enforceability. This commenter stated that while calculating a product weighted average MIR is arithmetically slightly more complex than simply adding up the percent of each ingredient classified as a VOC, this slight increase in complexity does not deter enforceability determinations, which were primarily based on the product formulations.

The commenter (85–3–3) further stated that there was nothing inherent in reactivity-based regulations that should unreasonably increase industry costs and that in both mass-based and reactivity-based cases, industry needed to keep records and the most significant costs were in the research and development process to develop and assess new product formulation technologies.

Another commenter (87–3–1) stated that quantifying compliance and recordkeeping costs relative to the implementation of a regulation was a difficult task for large, medium and small members of the industry and there were significant obstacles to gathering this type of information. Consequently, they stated they were unable to respond with any accurate data at this time without further clarification on the exact level of data needs.

Response: From the industry and trade associations responses, EPA concludes that in general, industry compliance and recordkeeping costs are not expected to be significantly different between mass-based and reactivity-based regulations and that generally, expenditures for formulation and research and development efforts exceed expenditures for compliance determination.

The EPA's concern in posing this question was whether reactivity-based programs resulted in a significant increase in compliance determination costs. This does not appear to be the case for industry, however, we are unsure of the potential impact on regulatory agencies since we did not receive any replies from regulatory agencies on this question. We believe that because reactivity-based programs rely on identifying and quantifying all the individual VOC ingredients in a coating to determine compliance, it appears reasonable to conclude that they can be more complex and costly than the traditional ''bake and weigh'' method employed in EPA Method 24 to determine compliance with a mass-based VOC limit. We recognize that some regulatory agencies such as the CARB have extensive laboratory capabilities and capable staff to conduct the required analysis using gas chromatography, however other States and local regulatory agencies may not have these capabilities and may need to investigate acquiring these resources and skills before developing their own reactivity-based regulations to ensure their programs are enforceable and have the opportunity to succeed.

C. Comments Asking EPA To Update and Expand Its Reactivity Policy

Comment: One commenter (83–3–2) believed EPA should encourage other States to evaluate opportunities to incorporate reactivity-based approaches into their VOC emissions and ozone control regulatory programs, and should not limit the use of photochemical reactivity to situations where further mass-based limits are difficult to achieve. The commenter further urged EPA to state clearly that the technical support provided by California would not necessarily represent what would be required in each case to support a reactivity-based approach.

Another commenter (85–2–4) stated that scientific studies provide a clear picture that both VOC mass and reactivity should be considered in ozone control strategies. This commenter also indicated that while reactivity reductions may not be appropriate for many consumer products or some other sources of VOC emissions, for some sources, reactivity reductions will represent the most cost-effective way to reduce ozone formation. The commenter (85–3–5) further stated that EPA should update and broaden its policies regarding reactivity and ozone attainment and (85–4–1) urged EPA to initiate a scientific-based policy review of its ozone attainment strategies to assure that the latest scientific studies are incorporated to encourage the most effective, and cost-effective control strategies.

Another commenter (87–3–2) stated that it was important that the Federal agency charged with stewardship over environmental issues be receptive to reactivity-based regulations. They further stated that many of the consumer products that could be addressed in this rulemaking have been regulated several times already and that further efforts to lower the mass-based VOC limits could be impossible without seriously altering the performance characteristics of the product or eliminating it from the marketplace altogether.

Response: Recently, EPA has issued interim guidance to States, which is published elsewhere in today's **Federal Register** encouraging them to consider recent scientific information on VOC reactivity in the development of ozone control measures. This interim guidance summarizes recent scientific findings, provides examples of innovative applications of reactivity information in the development of VOC control measures, and clarifies the relationship between innovative reactivity-based policies and EPA's current definition of VOC at 40 CFR 51.100(s). The EPA will continue to work with the CARB and other interested parties through the Reactivity Research Working Group (RRWG) (*http://www.cgenv.com/Narsto/reactinfo.html*) to improve the scientific foundation of VOC reactivity-based regulations. The EPA will update its guidance to States as new information becomes available.

III. Final Action

By this final rulemaking, EPA is approving: the CARB's aerosol coatings reactivity-based regulation and associated MIR tables into the SIP; the use of the CARB Method 310 to determine compliance with the CARB's reactivity-based regulation, granting SIP credit for the equivalent mass-based reductions achieved by the CARB's regulation, and modifying our regulatory definition of VOC at 40 CFR 51.100(s) to support the CARB's regulation.

IV. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735; October 4, 1993), the Agency must determine whether the regulatory action is ''significant'' and therefore subject to the Office of Management and Budget (OMB) review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

For the change in definition of VOCs, EPA has determined that this final rulemaking is not a ''significant regulatory action'' under the terms of Executive Order 12866 and is therefore not subject to the OMB review. For the approval of the CARB's rule into the SIP, the OMB has exempted this regulatory action from Executive Order 12866 review.

B. Paperwork Reduction Act

For the change in the definition of VOCs, this action does not impose an information collection burden under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* The change in the definition of VOCs only reinstates, for the purposes of determining compliance with California's aerosol coatings rule, compounds which were previously exempted from the definition of VOC. The change in the definition of VOCs does not impose any information collection requirements.

For the approval of the CARB's regulation into the SIP, this final rulemaking does not contain any information collection requirements that would require any person to provide information to EPA, however the CARB's regulation contain requirements for the aerosol coating industry to provide information to the CARB.

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 number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9.

C. Regulatory Flexibility Act (RFA)

The EPA has determined that it is not necessary to prepare a regulatory flexibility analysis in connection with this final rule.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration's 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 today's final rule on small entities, EPA has concluded that this action will not have a significant economic impact on a substantial number of small entities. This final action will not impose any requirements on small entities.

SIP approvals under section 110 and subchapter I, part D of the CAA do not create any new requirements but simply act on requirements that the State is already imposing.

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 by State, local, and Tribal governments, in the aggregate, or the private sector, of $100 million or more in any 1 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 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.

For the change in the definition of VOCs, today's rulemaking contains no Federal mandates (under the regulatory provisions of title II of the UMRA) for State, local, or Tribal governments or the private sector.

For the approval of the CARB's regulation into the SIP, EPA has determined that the approval action does not include a Federal mandate that may result in estimated costs of $100 million or more to either State, local, or Tribal governments in the aggregate, or to the private sector. This Federal action approves pre-existing requirements under State or local law, and imposes no new requirements. Accordingly, no additional costs to State, local, or Tribal governments, or to the private sector, result from this action.

Thus, today's rule is not subject to the requirements of sections 202 and 205 of the UMRA.

In addition, EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments in accordance with section 203 of the 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 Executive Order 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.''

This final rulemaking does not have federalism implications. It will 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 Executive Order 13132. Today's final rulemaking does not impose any new mandates on State or local governments. The change to the definition of VOCs merely assists the CARB in implementing its aerosol coatings reactivity regulation. The approval of this regulation into the SIP acts on a State regulation implementing a Federal standard, and does not alter the relationship or the distribution of power and responsibilities established in the CAA. Thus, Executive Order 13132 does not apply to this rule.

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

Executive Order 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.'' This final rule does not have Tribal implications, as specified in Executive Order 13175. The change to the definition of VOCs merely assists the CARB in implementing its aerosol coatings reactivity regulation and does not impose any direct compliance costs. The approval of the CARB's regulation into the SIP acts on a State regulation and does not alter the relationship between the Federal government and Indian Tribes, as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to this rule.

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 Executive Order 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, the Agency must 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.

While this final action is not subject to the Executive Order because it is not economically significant as defined in Executive Order 12866, we have reason to believe that ozone has a disproportionate effect on active children who play outdoors. (See 62 FR 38856 and 38859; July 18, 1997). However, we do not expect today's approval of the CARB's regulation into the SIP to result in an adverse impact, as it is intended to at least achieve the same ozone reductions as the mass-based limits they supplant. Also, we do not expect today's change to the definition of VOC to result in any adverse impact, because it increases the number of compounds subject to regulation as VOCs for the purpose of California's aerosol coatings reactivity-based regulation.

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

This rule is not subject to Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (66 FR 28355, May 22, 2001) because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer Advancement Act

As noted in the proposed rule, section 12(d) of the National Technology Transfer and Advancement Act of 1995 (''NTTAA''), Public Law No. 104–113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

For the change in definition of VOCs, this final rulemaking does not involve technical standards. Therefore, EPA did not consider the use of any voluntary consensus standards. For the approval of the CARB's regulation into the SIP, the State regulation references standard test methods and makes modifications to methods adopted by the American Society for Testing and Materials (ASTM) D3074–94, D3063–94, and D2879–97 to support the regulatory objectives. These ASTM methods can be obtained through the ASTM Web site at: *http://www.astm.org.*

J. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. The EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective 30 days after publication in the **Federal Register**.

K. Petitions for Judicial Review

Under section 307(b)(1) of the CAA, petitions for judicial review of this action must be filed in the United States Court of Appeals for the appropriate circuit by November 14, 2005. Filing a petition for reconsideration by the Administrator of this final rule does not affect the finality of this rule for the purposes of judicial review nor does it extend the time within which a petition for judicial review may be filed, and shall not postpone the effectiveness of such rule or action. This action may not be challenged later in proceedings to enforce its requirements. [See section 307(b)(2)].

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 52

Environmental protection, Air pollution control, Intergovernmental relations, Ozone, Reporting and recordkeeping requirements, Volatile organic compound.

Authority: 42 U.S.C. 7401 *et seq.*

Dated: September 2, 2005.

Stephen L. Johnson,

Administrator.

■ Parts 51 and 52, Chapter I, title 40 of the Code of Federal Regulations are 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)(6) to read as follows:

§ 51.100 Definitions.

* * * * *

(s) * * *

(6) For the purposes of determining compliance with California's aerosol coatings reactivity-based regulation, (as described in the California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Article 3), any organic compound in the volatile portion of an aerosol coating is counted towards that 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 VOCs are to be counted towards a product's reactivity limit for the purposes of determining compliance with California's aerosol coatings reactivity-based regulation.

* * * * *

PART 52—[AMENDED]

■ 1. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart F—California

■ 2. Section 52.220 is amended by adding paragraph (c)(338) to read as follows:

§ 52.220 Identification of plan.

* * * * *

(c) * * *

(338) New and amended regulations for the following agency were submitted on March 13, 2002, by the Governor's designee.

(i) Incorporation by reference.

(A) California Air Resources Board.

(*1*) California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Consumer Products, Article 3, Aerosol Coating Products, Sections 94520 to 94528, and Subchapter 8.6, Maximum Incremental Reactivity, Article 1, Tables of Maximum Incremental Reactivity (MIR) Values, Sections 94700 to 94701, both adopted on May 1, 2001.

* * * * *

[FR Doc. 05–18016 Filed 9–12–05; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[CA–319–0488c; FRL–7966–5]

Interim Final Determination To Stay and/or Defer Sanctions, San Joaquin Valley Unified Air Pollution Control District

AGENCY: Environmental Protection Agency (EPA).

ACTION: Interim final rule.

SUMMARY: EPA is making an interim final determination to stay and/or defer imposition of sanctions based on a proposed approval of revisions to the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) portion of the California State Implementation Plan (SIP) published elsewhere in today's **Federal Register**. The revisions concern San Joaquin Valley Unified Air Pollution Control District Rule 4623—Storage of Organic Liquids.

DATES: This interim final determination is effective on September 13, 2005. However, comments will be accepted until October 13, 2005.

ADDRESSES: Send comments to Andy Steckel, Rulemaking Office Chief (AIR–4), U.S. Environmental Protection Agency, Region IX, 75 Hawthorne Street, San Francisco, CA 94105 or e-mail to *steckel.andrew@epa.gov,* or submit comments at *http://www.regulations.gov.*

You can inspect copies of the submitted rule revisions, EPA's technical support document (TSD), and public comments at our Region IX office during normal business hours by appointment. You may also see copies of the submitted rule revisions by appointment at the following locations:

Rulemaking Office (AIR–4), Air Division, U.S. Environmental Protection Agency, Region IX, 75 Hawthorne Street, San Francisco, CA 94105;

California Air Resources Board, Stationary Source Division, Rule Evaluation Section, 1001 ''I'' Street, Sacramento, CA 95814; and

San Joaquin Valley Unified Air Pollution Control District, 1990 East Gettysburg Street, Fresno, CA 93726.

A copy of the rule may also be available via the Internet at *http://www.arb.ca.gov/drdb/drdbltxt.htm.* Please be advised that this is not an EPA Web site and may not contain the same version of the rule that was submitted to EPA.

FOR FURTHER INFORMATION CONTACT: Jerald S. Wamsley, EPA Region IX, at either (415) 947–4111, or *wamsley.jerry@epa.gov.*

SUPPLEMENTARY INFORMATION: Throughout this document, ''we,'' ''us'' and ''our'' refer to EPA.

I. Background

On January 22, 2004 (69 **Federal Register** (FR) 3012), we published a limited approval and limited disapproval of SJVUAPCD Rule 4623 as adopted locally on December 20, 2001 and submitted by the State on March 15, 2002. We based our limited disapproval action on certain deficiencies in the submittal. This disapproval action started a sanctions clock for imposition of offset sanctions 18 months after February 23, 2004 and highway sanctions 6 months later, pursuant to section 179 of the Clean Air Act (CAA) and our regulations at 40 CFR 52.31.

On May 19, 2005, SJVUAPCD adopted revisions to Rule 4623 that were intended to correct the deficiencies identified in our limited disapproval action. On July 15, 2005, the State submitted these revisions to EPA. In the Proposed Rules section of today's **Federal Register**, we have proposed approval of this submittal because we believe it corrects the deficiencies identified in our January 22, 2004 disapproval action. Based on today's proposed approval, we are taking this final rulemaking action, effective on publication, to stay and/or defer imposition of sanctions that were triggered by our January 22, 2004 limited disapproval.

EPA is providing the public with an opportunity to comment on this stay/deferral of sanctions. If comments are submitted that change our assessment described in this final determination and the proposed full approval of revised SJVUAPCD Rule 4623, we intend to take subsequent final action to reimpose sanctions pursuant to 40 CFR 51.31(d). If no comments are submitted that change our assessment, then all sanctions and sanction clocks will be permanently terminated on the effective date of a final rule approval.

II. EPA Action

We are making an interim final determination to stay and/or defer CAA section 179 sanctions associated with SJVUAPCD Rule 4623 based on our concurrent proposal to approve the State's SIP revision as correcting deficiencies that initiated sanctions.

Because EPA has preliminarily determined that the State has corrected the deficiencies identified in EPA's

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

§ 94520. Applicability

This article shall apply to any person who sells, supplies, offers for sale, applies, or manufactures aerosol coating products for use in the state of California, except as provided in section 94523.

NOTE: Authority cited: Sections 39600, 39601 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000 and 41712, Health and Safety Code.

REFERENCE

§ 94521. Definitions.

(a) For the purposes of this article, the following definitions apply:

(1) "Adhesive" means a product used to bond one surface to another.

(2) "Aerosol Coating Product" means a pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground traffic/marking applications.

(3) "Anti-Static Spray" means a product used to prevent or inhibit the accumulation of static electricity.

(4) "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.

(5) "ASTM" means the American Society for Testing and Materials.

(6) "Auto Body 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.

(7) "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.

(8) "Automotive Underbody Coating" means a flexible coating which contains asphalt or rubber and is designed and labeled exclusively for use on the underbody of motor vehicles to resist rust, abrasion and vibration, and to deaden sound.

(9) "Aviation Propeller Coating" means a coating designed and labeled exclusively to provide abrasion resistance and corrosion protection for aircraft propellers.

(10) “Aviation or Marine Primer” means a coating designed and labeled exclusively to meet federal specification TT-P-1757.
(11) “Base Reactive Organic Gas Mixture” (Base ROG Mixture) means the mixture of reactive organic gases utilized in deriving the MIR scale.
(12) “Belt Dressing” means a product applied on auto fan belts, water pump belting, power transmission belting, and industrial and farm machinery belting to prevent slipping, and to extend belt life.
(13) “Cleaner” means a product designed and labeled primarily to remove soil or other contaminants from surfaces.
(14) “Clear Coating” means a coating which is colorless, containing resins but no pigments except flatting agents, and is designed and labeled to form a transparent or translucent solid film.
(15) “Coating Solids” means the nonvolatile portion of an aerosol coating product, consisting of the film forming ingredients, including pigments and resins.
(16) “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.
(17) “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.
(18) “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.
(19) “Dye” means a product containing no resins which is used to color a surface or object without building a film.
(20) “Electrical Coating” means a coating designed and labeled exclusively as such, which is used exclusively to coat electrical components such as wire windings on electric motors to provide insulation and protection from corrosion.
(21) “Enamel” means a coating which cures by chemical cross-linking of its base resin and is not resoluble in its original solvent.
(22) “Engine Paint” means a coating designed and labeled exclusively to coat engines and their components.
(23) “Exact Match Finish, Engine Paint” means a coating which meets all of the following criteria: (A) the product is designed and labeled exclusively to exactly match the color of an original, factory-applied engine paint; (B) the product is labeled with the manufacturer's name for which they were formulated; and (C) the product is labeled with one of the following: (1.) the original equipment manufacturer's (O.E.M.) color code number; (2.) the color name; or (3.) other designation identifying the specific O.E.M. color to the purchaser.

(24) “Exact Match Finish, Automotive” means a topcoat which meets all of the following criteria: (A) 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; (B) the product is labeled with the manufacturer's name for which they were formulated; and (C) the product is labeled with one of the following: (1.) the original equipment manufacturer's (O.E.M.) color code number; (2.) the color name; or (3.) other designation identifying the specific O.E.M. color to the purchaser. Not withstanding 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.

(25) “Exact Match Finish, Industrial” means a coating which meets all of the following criteria: (A) 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; (B) the product is labeled with the manufacturer's name for which they were formulated; and (C) the product is labeled with one of the following: (1.) the original equipment manufacturer's (O.E.M.) color code number; (2.) the color name; or (3.) other designation identifying the specific O.E.M. color to the purchaser.

(26) “Executive Officer” means the Executive Officer of the Air Resources Board, or her or his delegate.

(27) “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.

(28) “Flatting Agent” means a compound added to a coating to reduce the gloss of the coating without adding color to the coating.

(29) “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.

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

(31) “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.

(32) “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 sprayhead designed to direct the spray toward the surface when the can is held in an inverted vertical position.

(33) “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.
(34) “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.
(35) “Ingredient” means a component of an aerosol coating product.
(36) “Ink” means a fluid or viscous substance used in the printing industry to produce letters, symbols or illustrations, but not to coat an entire surface.
(37) “Lacquer” means a thermoplastic film-forming material dissolved in organic solvent, which dries primarily by solvent evaporation, and is resoluble in its original solvent.
(38) “Layout Fluid” (or toolmaker's ink) means a coating designed and labeled exclusively to be sprayed on metal, glass or plastic, to provide a glare-free surface on which to scribe designs, patterns or engineering guide lines prior to shaping the piece.
(39) “Leather preservative or cleaner” means a leather treatment material applied exclusively to clean or preserve leather.
(40) “Lubricant” means a substance such as oil, petroleum distillates, grease, graphite, silicone, lithium, etc. that is used to reduce friction, heat, or wear when applied between surfaces.
(41) “Manufacturer” means any person who imports, manufactures, assembles, produces, packages, repackages, or relabels a consumer product.
(42) “Marine Spar Varnish” means a coating designed and labeled exclusively to provide a protective sealant for marine wood products.
(43) “Maskant” means a coating applied directly to a component to protect surface areas when chemical milling, anodizing, aging, bonding, plating, etching, or performing other chemical operations on the surface of the component.
(44) “Maximum Incremental Reactivity” (MIR) means the maximum change in weight of ozone formed by adding a compound to the “Base ROG Mixture” per weight of compound added, expressed to hundredths of a gram (g O_3/g ROC). MIR values for individual compounds and hydrocarbon solvents are specified in sections 94700 and 94701, Title 17, California Code of Regulations.
(45) “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.”
(46) “Mold Release” means a coating applied to molds to prevent products from sticking to the surfaces of the mold.

(47) "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.
(48) "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.
(49) "Ozone" means a colorless gas with a pungent odor, having the molecular form O_3.
(50) "Percent VOC By Weight" means the ratio of the weight of VOC to the total weight of the product contents expressed as follows:
Percent VOC By Weight = $(W_{VOC} / W_{total}) \times 100$
Where:
(A) for products containing no water and no volatile compounds exempt from the definition of VOC: W_{voc} = the weight of volatile compounds;
(B) for products containing water or exempt compounds: W_{voc} = the weight of volatile compounds, less water, and less compounds exempt from the VOC definition in this section 94521; and
(C) W_{total} = the total weight of the product contents.
(51) "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.
(52) "Pleasure Craft" means privately owned vessels used for noncommercial purposes.
(53) "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.
(54) "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.
(55) "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.
(56) "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.

(57) "Product-Weighted MIR" (PWMIR) means the sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging) and calculated according to the following equations:

(a) Weighted MIR (Wtd-MIR) ingredient = MIR x Weight fraction ingredient, and,

(b) Product Weighted MIR = $(\text{Wtd-MIR})_1 + (\text{Wtd-MIR})_2 + \ldots + (\text{Wtd- MIR})_n$

where,

MIR = ingredient MIR, as specified in section 94522(h);

Wtd-MIR = MIR of each ingredient in a product multiplied by the weight fraction of that ingredient, as shown in (a);

1,2,3,...,n = each ingredient in the product up to the total n ingredients in the product.

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

(59) "Reactivity Limit" means the maximum "product-weighted MIR" allowed in an aerosol coating product that is subject to the limits specified in section 94522(a)(3) for a specific category, expressed as g O_3/g product.

(60) "Reactive Organic Compound (ROC)" means any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

(61) "Responsible Party" 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.

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

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

(64) "Rust Converter" means a product designed and labeled exclusively to convert rust to an inert material and which contains a minimum acid content of 0.5 percent by weight, and a maximum coating solids content of 0.5 percent by weight.

(65) "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.

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

(67) “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.
(68) “Stain” means a coating which is designed and labeled to change the color of a surface but not conceal the surface.
(69) “Upper-Limit Kinetic Reactivity” (ULKR) means the maximum percentage of the emitted ROC which has reacted. For this article, the ULKR is one hundred percent and is used to calculate the ULMIR.
(70) “Upper-Limit Mechanistic Reactivity” (ULMR) means the maximum gram(s) of ozone formed per gram of reactive organic compound (ROC) reacting. The ULMR is used to calculate the ULMIR.
(71) “Upper-Limit MIR” (ULMIR) means the upper-limit kinetic reactivity (ULKR) multiplied by the upper-limit mechanistic reactivity (ULMR), as calculated using the following equation:

ULMIR = Upper Limit KR x Upper Limit MR.

The units for ULMIR are g O_3/g ROC.

(72) “Vinyl/Fabric/Leather/Polycarbonate Coating” means a coating designed and labeled exclusively to coat vinyl, fabric, leather, or polycarbonate substrates.
(73) “Volatile Organic Compound (VOC)” means any compound containing at least one atom of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, and excluding the following:

(A) methane,
methylene chloride (dichloromethane),
1,1,1-trichloroethane (methyl chloroform),
trichlorofluoromethane (CFC-11),
dichlorodifluoromethane (CFC-12),
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113),
1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114),
chloropentafluoroethane (CFC-115),
chlorodifluoromethane (HCFC-22),
1,1,1-trifluoro-2,2-dichloroethane (HCFC-123),
1,1-dichloro-1-fluoroethane (HCFC-141b),
1-chloro-1,1-difluoroethane (HCFC-142b),
2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124),
trifluoromethane (HFC-23),
1,1,2,2-tetrafluoroethane (HFC-134),
1,1,1,2-tetrafluoroethane (HFC-134a),
pentafluoroethane (HFC-125),

1,1,1-trifluoroethane (HFC-143a),
1,1-difluoroethane (HFC-152a),
cyclic, branched, or linear completely methylated siloxanes,
the following classes of perfluorocarbons:
1. cyclic, branched, or linear, completely fluorinated alkanes;
2. cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;
3. cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and
4. sulfur-containing perfluorocarbons with no unsaturations and with the sulfur bonds to carbon and fluorine, and
(B) the following low-reactive organic compounds which have been exempted by the U.S. EPA:
acetone,
ethane,
methyl acetate,
parachlorobenzotrifluoride (1-chloro-4-trifluoromethyl benzene),
perchloroethylene (tetrachloroethylene).

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

(75) "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). The weight fraction is calculated according to the following equation:

$$\text{Weight Fraction} = \frac{\text{Weight of the ingredient}}{\text{Total product net weight (excluding container and packaging)}}$$

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

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

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

(79) "Working Day" means any day between Monday through Friday, inclusive, except for days that are federal holidays.

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

NOTE: Authority cited: Sections 39600, 39601 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000 and 41712, Health and Safety Code.

REFERENCE

§ 94522. Limits and Requirements for Aerosol Coating Products. (a)(1) Compliance with Limits. Aerosol coating products manufactured beginning June 1, 2002, for the general coating categories and beginning January 1, 2003, for the specialty coating categories shall comply with the reactivity requirements specified in 94522(a)(3). Aerosol coating products manufactured before the effective dates of the reactivity limits specified in section 94522(a)(3) shall comply with the VOC requirements specified in section 94522(a)(2), except for products that are labeled by the manufacturer with the applicable reactivity limit, as provided in section 94524(b)(1)(B). If an aerosol coating product is so labeled, then the product shall comply with the reactivity requirements specified in section 94522(a)(3), regardless of the date on which the product was manufactured.

(a)(2) VOC Limits for Aerosol Coating Products. Except as provided in sections 94522(a)(1), 94523 (Exemptions), 94525 (Variances), 94540 through 94555 (Alternative Control Plan), and 94567(a)(1) (Hairspray Credit Program), Title 17, California Code of Regulations, no person shall sell, supply, offer for sale, apply, or manufacture for use in California, any aerosol coating product which, at the time of sale, use, or manufacture, contains volatile organic compounds in excess of the limits specified in the following Table of Standards after the specified effective dates.

Table of Standards
Percent Volatile Organic Compounds by Weight[1]

Aerosol Coating Category	*1/8/96*
General Coatings	
Clear Coatings	67.0
Flat Paint Products	60.0
Fluorescent Coatings	75.0
Metallic Coatings	80.0
Nonflat Paint Products	65.0
Primers	60.0
Specialty Coatings	
Art Fixatives or Sealants	95.0
Auto Body Primers	80.0

Automotive Bumper and Trim Products	95.0
Aviation or Marine Primers	80.0
Aviation Propeller Coatings	84.0
Corrosion Resistant Brass, Bronze, or Copper Coatings	92.0
Exact Match Finishes:	
Engine Enamel	80.0
Automotive	88.0
Industrial	88.0
Floral Sprays	95.0
Glass Coatings	95.0
Ground Traffic/Marking Coatings	66.0
High Temperature Coatings	80.0
Hobby/Model/Craft Coatings:	
Enamel	80.0
Lacquer	88.0
Clear or Metallic	95.0
Marine Spar Varnishes	85.0
Photograph Coatings	95.0
Pleasure Craft Finish Primers, Surfacers or Undercoaters	75.0
Pleasure Craft Topcoats	80.0
Shellac Sealers:	
Clear	88.0
Pigmented	75.0
Slip-Resistant Coatings	80.0
Spatter/Multicolor Coatings	80.0
Vinyl/Fabric/Leather/Polycarbonate Coatings	95.0
Webbing/Veil Coatings	90.0
Weld-Through Primers	75.0
Wood Stains	95.0
Wood Touch-Up, Repair or Restoration Coatings	95.0

[1] As specified in section 94522(c), for aerosol coating products containing methylene chloride, the VOC standards specified in this subsection (a)(2) shall apply to the combined percent VOC and methylene chloride by weight.

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

(a)(3) Reactivity Limits for Aerosol Coating Products.

(A) Except as provided in sections 94522(a)(1), 94523 (Exemptions) and 94525 (Variances), Title 17, California Code of Regulations, no person shall sell, supply, offer for sale, apply, or manufacture for use in California, any aerosol coating product which, at the time of sale, use, or manufacture, contains reactive organic compounds that have a PWMIR in excess of the limits specified in the following Table of Limits after the specified effective date.

Table of Limits
Product-Weighted MIR in Grams Ozone per Gram Product
(g O_3 / g product)

Aerosol Coating Category

General Coatings	**06/01/2002**
Clear Coatings	1.50
Flat Paint Products	1.20
Fluorescent Coatings	1.75
Metallic Coatings	1.90
Nonflat Paint Products	1.40
Primers	1.20

Specialty Coatings	**01/01/2003**
Art Fixatives or Sealants	1.80
Auto Body Primers	1.55
Automotive Bumper and Trim Products	1.75
Aviation or Marine Primers	2.00
Aviation Propeller Coatings	2.50
Corrosion Resistant Brass, Bronze, or Copper Coatings	1.80
Exact Match Finishes:	
Engine Enamel	1.70
Automotive	1.50
Industrial	2.05
Floral Sprays	1.70
Glass Coatings	1.40
Ground Traffic/Marking Coatings	1.20
High Temperature Coatings	1.85

Hobby/Model/Craft Coatings:	
Enamel	1.45
Lacquer	2.70
Clear or Metallic	1.60
Marine Spar Varnishes	0.90
Photograph Coatings	1.00
Pleasure Craft Finish Primers, Surfacers or Undercoaters	1.05
Pleasure Craft Topcoats	0.60
Polyolefin Adhesion Promoters	2.50
Shellac Sealers:	
Clear	1.00
Pigmented	0.95
Slip-Resistant Coatings	2.45
Spatter/Multicolor Coatings	1.05
Vinyl/Fabric/Leather/Polycarbonate Coatings	1.55
Webbing/Veil Coatings	0.85
Weld-Through Primers	1.00
Wood Stains	1.40
Wood Touch-Up, Repair or Restoration Coatings	1.50

(a)(4) If an aerosol coating product is subject to both a general coating limit and a specialty coating limit, as listed in section 94522(a)(2) or (a)(3), and the product meets all the criteria of the applicable specialty coating category as defined in section 94521, then the specialty coating limit shall apply instead of the general coating limit.

(a)(5) Notwithstanding the provisions of sections 94522(a)(4) or 94524(a), high-temperature coatings that contain at least 0.5 percent by weight of an elemental metallic pigment in the formulation, including propellant, shall be subject to the limit specified for metallic coatings.

(a)(6) The Alternative Control Plan Regulation (sections 94540-94555) may not be used for aerosol coating products subject to the reactivity limits specified in section 94522(a)(3).

(b) **Sell-Through of Products Subject to the VOC Limits Specified in Section 94522(a)(2).**

Notwithstanding the provisions of section 94522(a)(1) and (a)(3), an aerosol coating product manufactured prior to each of the effective dates specified for that product in section 94522(a)(3) may be sold, supplied, offered for sale, or

applied for up to three years after each of the specified effective dates, provided that the product complies with the limit specified in section 94522(a)(2). This subsection (b) does not apply to any product which does not display on the product container or package the date on which the product was manufactured, or a code indicating such date.

(c) **Products Containing Methylene Chloride or Trichloroethylene**.

(1) Requirements for Products Subject to the VOC Limits Specified in Section 94522(a)(2).

For any aerosol coating product containing methylene chloride, the VOC standards specified in section 94522(a)(2) shall apply to the combined percent by weight of both volatile organic compounds, and methylene chloride, calculated as follows:

(Percent by weight VOC + Percent by weight methylene chloride) must be less than or equal to the applicable VOC standard

(2) Requirements for Products Subject to the Reactivity Limits Specified in Section 94522(a)(3).

(A) For any aerosol coating product subject to the reactivity limits specified in section 94522(a)(3), no person shall sell, supply, offer for sale, apply, or manufacture for use in California any aerosol coating product which contains methylene chloride or trichloroethylene.

(B) The requirements of section 94522(c)(2) shall not apply to any aerosol coating product containing methylene chloride or trichloroethylene that is present as an impurity in a combined amount equal to or less than 0.01% by weight of the product.

(d) **Products Containing Perchloroethylene or Ozone Depleting Substances**.

(1) Requirements for Products Subject to the VOC Limits Specified in Section 94522(a)(2).

For any aerosol coating product subject to the VOC limits specified in section 94522(a)(2), no person shall sell, supply, offer for sale, apply, or manufacture for use in California any aerosol coating product which contains perchloroethylene, or an ozone depleting substance identified by the United States Environmental Protection Agency in the Code of Federal Regulations, 40 CFR Part 82, Subpart A, under Appendices A and B, July 1, 1998. The requirements of this section 94522(d)(1) shall not apply to (A) any existing product formulation that complies with the Table of Standards and was sold in California during calendar year 1992, or (B) any product formulation that was sold in California during calendar year 1992 that is reformulated to meet the Table of Standards, as long as the content of perchloroethylene, or ozone depleting substances, as identified in this section 94522(d), in the reformulated product does not increase.

(2)Requirements for Products Subject to the Reactivity Limits Specified in Section 94522(a)(3).

(A) Perchloroethylene

For any aerosol coating product subject to the reactivity limits specified in section 94522(a)(3), no person shall sell, supply, offer for sale, apply, or manufacture for use in California any aerosol coating product which contains perchloroethylene.

(B) Ozone Depleting Substances

For any aerosol coating product subject to the reactivity limits specified in section 94522(a)(3), no person shall sell, supply, offer for sale, apply, or manufacture for use in California any aerosol coating product which contains an ozone depleting substance identified by the United States Environmental Protection Agency in the Code of Federal Regulations, 40 CFR Part 82, Subpart A, under Appendices A and B, July 1, 1998. The requirements of this section 94522(d)(2) shall not apply to (1.) any existing product formulation containing an ozone depleting substance that complies with the Table of Limits and was sold in California during calendar year 1997, or (2.) any product formulation containing an ozone depleting substance that was sold in California during calendar year 1997 that is reformulated to meet the Table of Limits, as long as the content of ozone depleting substances, as identified in this section 94522(d)(2), in the reformulated product does not increase.

(3) The requirements of section 94522(d)(1) and (d)(2) shall not apply to any aerosol coating product containing perchloroethylene, or an ozone depleting substance as identified in section 94522(d)(1) or (d)(2), that are present as impurities in a combined amount equal to or less than 0.01% by weight of the product.

(e) **Multicomponent Kits.**

(1) Requirements for Products Subject to the VOC Limits Specified in Section 94522(a)(2).

No person shall sell, supply, offer for sale, apply, or manufacture for use in California any multi-component kit, as defined in section 94521, in which the total weight of VOC and methylene chloride contained in the multi-component kit $(\text{Total VOC + MC})_{actual}$ is greater than the total weight of VOC and methylene chloride that would be allowed in the multi-component kit if each component product in the kit had separately met the applicable VOC standards $(\text{Total VOC+ MC})_{standard}$ as calculated below:

$$(\text{Total VOC + MC})_{actual} = (VOC_1 \times W_1) + (MC_1 \times W_1) + (VOC_2 \times W_2) + (MC_2 \times W_2) + (VOC_n \times W_n) + (MC_n \times W_n)$$

$$(\text{Total VOC} + \text{MC})_{standard} = (STD_1 \times W_1) + (STD_2 \times W_2) + (STD_n \times W_n)$$

Where:

VOC = the percent by weight VOC of the component product

MC = the percent by weight methylene chloride of the component product

STD = the VOC standard specified in section 94522(a) which applies to the component product.

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

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

(2) Requirements for Products Subject to the Reactivity Limits Specified in Section 94522(a)(3).

No person shall sell, supply, offer for sale, apply, or manufacture for use in California any multi-component kit, as defined in section 94521, in which the Kit PWMIR is greater than the Total Reactivity Limit. The Total Reactivity Limit represents the limit that would be allowed in the multi-component kit if each component product in the kit had separately met the applicable Reactivity Limit. The Kit PWMIR and Total Reactivity Limit are calculated as in equations (1), (2) and (3) below:

(1) $\text{Kit PWMIR} = (PWMIR_{(1)} \times W_1) + (PWMIR_{(2)} \times W_2) + \ldots + (PWMIR_{(n)} \times W_n)$

(2) $\text{Total Reactivity Limit} = (RL_1 \times W_1) + (RL_2 \times W_2) + \ldots + (RL_n \times W_n)$

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

Where:

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

RL = the Reactivity Limit specified in section 94522(a)(3)

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

(f) **Products Assembled by Adding Bulk Paint to Aerosol Containers of Propellant**. No person shall sell, supply, offer for sale, apply, or manufacture for use in the state of California any aerosol coating product assembled by adding bulk paint to aerosol containers of propellant, unless such products comply with the VOC standards specified in section 94522(a)(2), or with the reactivity limits specified in section 94522(a)(3) for products subject to those limits.

(g) **Requirements for Lacquer Aerosol Coating Products Subject to the VOC Limits Specified in Section 94522(a)(2).**

(1) Notwithstanding the provisions of Section 94522(a)(2), lacquer aerosol coating products may be sold, supplied, offered for sale, applied, or manufactured for use in California with a combined VOC and methylene chloride content of up to 80 percent by weight until January 1, 1998.
(2) On or after January 1, 1998, all lacquer aerosol coating products sold, supplied, offered for sale, applied, or manufactured for use in California shall comply with the provisions of section 94522(a)(2), except that lacquer aerosol coating products manufactured prior to January 1, 1998 may be sold, supplied, offered for sale, or applied until January 1, 2001, as long as the product displays on the product container or package the date on which the product was manufactured or a code indicating such date.
(3) This subsection (g) does not apply to: (A) any lacquer coating product not clearly labeled as such, or (B) any lacquer coating product which is sold, supplied, offered for sale, applied, or manufactured for use in the Bay Area Air Quality Management District (BAAQMD) and is subject to BAAQMD Rule 8-49, or (C) any lacquer coating product that meets the definition of “clear coating” specified in section 94521.
(h) **Assignment of Maximum Incremental Reactivity (MIR) Values.**
(1) In order to calculate the PWMIR of aerosol coating products as specified in section 94521(a)(57), the MIR values of product ingredients are assigned as follows:
(A) Any ingredient which does not contain carbon is assigned a MIR value of 0.0.
(B) Any aerosol coating solid, including but not limited to resins, pigments, fillers, plasticizers, and extenders is assigned a MIR value of 0.0.
(C) For any ROC not covered under (1)(A) and (1)(B) of this subsection (h), each ROC is assigned the MIR value set forth in Subchapter 8.6, Article 1, sections 94700 and 94701, Title 17, California Code of Regulations.
(D) Except as provided in subsection (h)(3), only ROCs listed in sections 94700 and 94701, Title 17, California Code of Regulations, can be used to comply with the reactivity limits specified in section 94522(a)(3).
(E) All individual compounds in an amount equal to or exceeding 0.1 percent shall be considered ingredients in calculating the PWMIR. Such individual compounds shall be considered ingredients whether or not they are reported by the manufacturer pursuant to section 94526(b).
(2) (A) The MIR values dated [Effective Date] shall be used to calculate the PWMIR for aerosol coating products, and these MIR values shall not be changed until June 1, 2007.

(B) If a new ROC is added to section 94700 or 94701, then the new ROC may be used in aerosol coating products, and the MIR value for the new ROC shall be used to calculate the PWMIR after the effective date of the MIR value.

(3) The MIR value for any aromatic hydrocarbon solvent with a boiling range different from the ranges specified in section 94701(b) shall be assigned as follows:

(A) if the solvent dry point is lower than or equal to 420 degrees F, the MIR value specified in section 94701(b) for bin 23 shall be used.

(B) if the solvent initial boiling point is higher than 420 degrees F, the MIR value specified in section 94701(b) for bin 24 shall be used.

NOTE: Authority cited: Sections 39600, 39601, and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000, and 41712, Health and Safety Code.

REFERENCE

§ 94523. Exemptions.

(a) This article shall not apply to aerosol lubricants, mold releases, automotive underbody coatings, electrical coatings, Cleaners, belt dressings, anti-static sprays, layout fluids and removers, adhesives, maskants, rust converters, dyes, inks, and leather preservatives or cleaners.

(b) This article shall not apply to any aerosol coating product manufactured in California for shipment and use outside of California.

(c) The provisions of this article shall not apply to a manufacturer, distributor, or responsible party who sells, supplies, or offers for sale in California an aerosol coating product that does not comply with the limits specified in section 94522(a)(2) or (a)(3), as long as the manufacturer, distributor, or responsible party can demonstrate both that the aerosol coating product is intended for shipment and use outside of California, and that the manufacturer, distributor, or responsible party has taken reasonable prudent precautions to assure that the aerosol coating product is not distributed to California. This subsection (c) does not apply to aerosol coating products that are sold, supplied, or offered for sale by any person to retail outlets in California.

(d) The requirements in section 94522(a)(2) and (a)(3) prohibiting the application of aerosol coating products that exceed the limits specified in the sections 94522(a)(2) or (a)(3) shall apply only to commercial application of aerosol coating products.

NOTE: Authority cited: Sections 39600, 39601 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000 and 41712, Health and Safety Code.

REFERENCE

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

§ 94524. Administrative Requirements.

(a) **Most Restrictive Limit.**

Except as otherwise provided in section 94522(a)(4), if anywhere on the container of any aerosol coating product subject to the specified limits in section 94522(a)(2) or (a)(3), or on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made 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 shall apply.

(b) **Labeling Requirements.**

(1) Both the manufacturer and responsible party for each aerosol coating product subject to this article shall ensure that all products clearly display the following information on each product container which is manufactured 90 days or later after the effective date of this article.

(A) Products subject to the VOC limits specified in section 94522(a)(2) shall display: 1. the applicable VOC standard for the product that is specified in section 94522(a)(2), expressed as a percentage by weight unless the product is included in an alternative control plan approved by the Executive Officer, as provided in Article 4, Sections 94540-94555, Title 17, California Code of Regulations, and the product exceeds the applicable VOC standard; 2. if the product is included in an alternative control plan approved by the Executive Officer, and the product exceeds the applicable VOC standard specified in section 94522(a)(2), the product shall be labeled with the term “ACP” or “ACP product”; 3. the aerosol coating category as defined in section 94521, or an abbreviation of the coating category; and 4. the day, month, and year on which the product was manufactured, or a code indicating such date.

(B) Products subject to the reactivity limits specified in section 94522(a)(3) shall display: 1. The applicable reactivity limit for the products that is specified in section 94522(a)(3); 2. The aerosol coating category as defined in section 94521, or an abbreviation of the coating category; and 3. The day, month, and year on which the product was manufactured, or a code indicating such date.

(2) The information required in section 94524(b)(1), shall be displayed on the product container such that it is readily observable without removing or disassembling any portion of the product container or packaging. For the purposes of this subsection, information may be displayed on the bottom of a container as long as it is clearly legible without removing any product packaging.

(3) No person shall remove, alter, conceal, or deface the information required in section 94524(b)(1) prior to final sale of the product.

(4) For any aerosol coating product subject to section 94522(a), if the manufacturer or responsible party uses a code indicating the date of manufacture

or an abbreviation of the coating category as defined in section 94521, an explanation of the Code or abbreviation must be filed with the Executive Officer prior to the use of the code or abbreviation

(c) **Reporting Requirements.**

(1) Any responsible party for an aerosol coating product subject to this article which is sold, supplied, or offered for sale in California, must supply the Executive Officer of the Air Resources Board with the following information within 90 days of the effective date of this article: the company name, mail address, contact person, and the telephone number of the contact person. For responsible parties who do not manufacture their own aerosol coating products, the responsible party shall also supply the information specified in this subsection (c)(1) for those manufacturers which produce products for the responsible party. The responsible party shall also notify the Executive Officer within 90 days of any change in the information supplied to the Executive Officer pursuant to this subsection (c)(1).

(2) Upon 90 days written notice, each manufacturer or responsible party subject to this article shall submit to the Executive Officer a written report with all of the following information for each product they manufacture under their name or another company's name:

(A) the brand name of the product;

(B) upon request, a copy of the product label;

(C) the owner of the trademark or brand names;

(D) the product category as defined in section 94521;

(E) the annual California sales in pounds per year and the method used to calculate California annual sales;

(F) product formulation data: 1. For products subject to the VOC limits specified in section 94522(a)(2), the percent by weight VOC, water, solids, propellant, and any compounds exempt from the definition of VOC as specified in section 94521; 2. for products subject to the reactivity limits specified in section 94522(a)(3), the PWMIR and the weight fraction of all ingredients including: water, solids, each ROC, and any compounds assigned a MIR value of zero as specified in sections 94522(h), 94700, or 94701 [Each ROC must be reported as an ingredient if it is present in an amount greater than or equal to 0.1 percent by weight of the final aerosol coatings formulation. If an individual ROC 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 following definition does not need to be reported as an ingredient.

For the purpose of this section, an “impurity” means an individual chemical compound present in a raw material which is incorporated into the final aerosol

coatings formulation, if the compound is present below the following amounts in the raw material:

(i) for individual compounds that are carcinogens, as defined in 29 CFR section 1910.1200(d)(4), each compound must be present in an amount less than 0.1 percent by weight in order to be considered an "impurity."

(ii) for all other compounds present in a raw material, a compound must be present in an amount less than 1 percent by weight in order to be considered an "impurity"];

(G) an identification of each product brand name as a "household," "industrial," or "both" product; and

(H) any other information necessary to determine the emissions or the product-weighted MIR from aerosol coating products.

The information requested in this section (c)(2) may be supplied as an average for a group of aerosol coating products within the same coating category when the products do not vary in VOC content by more then two percent (by weight), and the coatings are based on the same resin type, or the products are color variations of the same product (even if the coatings vary by more than 2 percent in VOC content).

(3) Upon written request, the responsible party for aerosol coating products subject to this article shall supply the executive officer with a list of all exempt compounds contained in any aerosol coating product within 15 working days.

(d) **Treatment of Confidential Information.**

All information submitted by manufacturers pursuant to section 94524 shall be handled in accordance with the procedures specified in Title 17, California Code of Regulations, sections 91000-91022.

(e) **Special Reporting Requirements for Perchloroethlene-Containing Aerosol Coatings.**

(1) The requirements of this subsection shall apply to all responsible parties for perchloroethylene-containing aerosol coatings sold or offered for sale in California on or after January 1, 1996. For the purpose of this subsection, "perchloroethylene-containing aerosol coatings" means any aerosol coating that is required to comply with any limit specified in section 94522(a)(2) or (a)(3) and contains 1.0 percent or more by weight (exclusive of the container or packaging) of perchloroethylene (tetrachlorethylene).

(2) Reporting Requirements to Establish Baseline. On or before March 1, 1997, or 60 days after the effective date of this subsection (e) (whichever date occurs later), all responsible parties for perchloroethylene-containing aerosol coatings shall report to the Executive Officer the following information for each product:

(A) the product brand name and a copy of the product label with legible usage instructions;

(B) the product category to which the aerosol coating belongs;

(C) the total amount of the aerosol coating sold in California between January 1, 1996 and December 31, 1996, to the nearest pound (exclusive of the container or packaging), and the method used for calculating the California sales;

(D) the weight percent, to the nearest 0.10 percent, of perchloroethylene in the aerosol coating;

(3) Annual Reporting Requirements. On or before March 1, 1998, March 1, 1999, March 1, 2000, March 1, 2001, and March 1, 2002, all responsible parties subject to the requirements of this subsection shall provide to the Executive Officer an update which reports, for the previous calendar year, any changes in the annual California sales, perchlorethylene content, or any other information provided pursuant to subsections (e)(2)(A) through (e)(2)(D). After March 1, 2002, responsible parties are not required to submit this information unless specifically required to do so by the Executive Officer.

(4) Upon request, the Executive Officer shall make the information submitted pursuant to this subsection available to publicly owned treatment works in California, in accordance with the procedures for handling of confidential information specified in Title 17, California Code of Regulations, sections 91000-91022.

(A) On or before July 1, 2002, the Executive Officer shall evaluate the information, along with data on influent and effluent levels of perchloroethylene as reported by publicly-owned treatment works and any other relevant information, to determine if it is likely that publicly-owned treatment works are experiencing increased levels of perchloroethylene, relative to 1996 levels, that can be attributed to aerosol coatings which contain perchloroethylene.

(B) If the Executive Officer determines that it is likely that increased perchloroethylene levels at the publicly-owned treatment works are caused by increased levels of perchloroethylene in consumer products subject to this regulation, then the Executive Officer shall, in conjunction with the publicly-owned treatment works, implement measures which are feasible, appropriate, and necessary for reducing perchloroethylene levels at the publicly-owned treatment works.

NOTE: Authority cited: Sections 39600, 39601, 41511 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000, 41511 and 41712, Health and Safety Code

REFERENCE

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

§ 94525. Variances.

(a) Any person who cannot comply with the requirements set forth in Section 94522, because of extraordinary reasons beyond the person's reasonable control may apply in writing to the Executive Officer for a variance. The variance application shall set forth:

(1) the specific grounds upon which the variance is sought;

(2) the proposed date(s) by which compliance with the provisions of Section 94522 will be achieved, and

(3) a compliance report reasonably detailing the method(s) by which compliance will be achieved.

(b) Upon receipt of a variance application containing the information required in subsection (a), the Executive Officer shall hold a public hearing to determine whether, under what conditions, and to what extent, a variance from the requirements in Section 94522 is necessary and will be permitted. A hearing shall be initiated no later than 75 working days after receipt of a variance application. Notice of the time and place of the hearing shall be sent to the applicant by certified mail not less than 30 days prior to the hearing. Notice of the hearing shall also be submitted for publication in the California Regulatory Notice Register and sent to every person who requests such notice, not less than 30 days prior to the hearing. The notice shall state that the parties may, but need not be, represented by counsel at the hearing. At least 30 days prior to the hearing, the variance application shall be made available to the public for inspection. Information submitted to the Executive Officer by a variance applicant may be claimed as confidential, and such information shall be handled in accordance with the procedures specified in Title 17, California Code of Regulations, Sections 91000-91022. The Executive Officer may consider such confidential information in reaching a decision on a variance application. Interested members of the public shall be allowed a reasonable opportunity to testify at the hearing and their testimony shall be considered.

(c) No variance shall be granted unless all of the following findings are made:

(1) that, because of reasons beyond the reasonable control of the applicant, requiring compliance with Section 94522 would result in extraordinary economic hardship.

(2) that the public interest in mitigating the extraordinary hardship to the applicant by issuing the variance outweighs the public interest in avoiding any increased emissions of air contaminants which would result from issuing the variance.

(3) that the compliance report proposed by the applicant can reasonably be implemented, and will achieve compliance as expeditiously as possible.

(d) Any variance order shall specify a final compliance date by which the requirements of Section 94522 will be achieved. Any variance order shall contain a condition that specifies increments of progress necessary to assure timely compliance, and such other conditions that the Executive Officer, in consideration of the testimony received at the hearing, finds necessary to carry out the purposes of Division 26 of the Health and Safety Code.

(e) A variance shall cease to be effective upon failure of the party to whom the variance was granted to comply with any term or condition of the variance.

(f) Upon the application of any person, the Executive Officer may review, and for good cause, modify or revoke a variance from the requirements of Section 94522 after holding a public hearing in accordance with the provisions of subsection 94525(b).

NOTE: Authority cited: Sections 39600, 39601 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000 and 41712, Health and Safety Code.

REFERENCE

§ 94526. Test Methods.

Compliance with the requirements of this article shall be determined by using the following test methods, which are incorporated by reference herein. Alternative test methods which are shown to accurately determine the VOC content, ingredient name and weight percent of each ingredient, exempt compound content, metal content, specular gloss, or acid content may also be used after approval in writing by the Executive Officer:

(a) Testing for Products Subject to the VOC Limit Specified in Section 94522(a)(2).

(1) VOC Content. The VOC content of all aerosol coating products subject to the provisions of this article shall be determined by the procedures set forth in "Air Resources Board Method 310, Determination of Volatile Organic Compounds (VOC) in Consumer Products," adopted September 25, 1997 and as last amended on July 18, 2001.

(2) In sections 3.5 and 3.7 of Air Resources Board (ARB) Method 310, a process is specified for the "Initial Determination of VOC Content" and the "Final Determination of VOC Content". This process is an integral part of testing procedures set forth in ARB Method 310, and is reproduced below:

Sections 3.5 and 3.7 of Air Resources Board Method 310

3.5 Initial Determination of VOC Content. The Executive Officer will determine the VOC content pursuant to sections 3.2 and 3.3. Only those

components with concentrations equal to or greater than 0.1 percent by weight will be reported.

3.5.1 Using the appropriate formula specified in section 4.0, the Executive Officer will make an initial determination of whether the product meets the applicable VOC standards specified in ARB regulations. If initial results show that the product does not meet the applicable VOC standards, the Executive Officer may perform additional testing to confirm the initial results.

3.5.2 If the results obtained under section 3.5.1 show that the product does not meet the applicable VOC standards, the Executive Officer will request the product manufacturer or responsible party to supply product formulation data. The manufacturer or responsible party shall supply the requested information. Information submitted to the ARB Executive Officer may be claimed as confidential; such information will be handled in accordance with the confidentiality procedures specified in Title 17, California Code of Regulations, sections 91000 to 91022.

3.5.3 If the information supplied by the manufacturer or responsible party shows that the product does not meet the applicable VOC standards, then the Executive Officer will take appropriate enforcement action.

3.5.4 If the manufacturer or responsible party fails to provide formulation data as specified in section 3.5.2, the initial determination of VOC content under this section 3.5 shall determine if the product is in compliance with the applicable VOC standards. This determination may be used to establish a violation of ARB regulations.

3.7 Final Determination of VOC Content. If a product's compliance status is not satisfactorily resolved under sections 3.5 and 3.6, the Executive Officer will conduct further analyses and testing as necessary to verify the formulation data.

3.7.1 If the accuracy of the supplied formulation data is verified and the product sample is determined to meet the applicable VOC standards, then no enforcement action for violation of the VOC standards will be taken.

3.7.2 If the Executive Officer is unable to verify the accuracy of the supplied formulation data, then the Executive Officer will request the product manufacturer or responsible party to supply information to explain the discrepancy.

3.7.3 If there exists a discrepancy that cannot be resolved between the results of Method 310 and the supplied formulation data, then the results of Method 310 shall take precedence over the supplied formulation data. The results of Method 310 shall then determine if the product is in compliance with the applicable VOC standards, and may be used to establish a violation of ARB regulations.

(b) Testing for Products Subject to the Reactivity Limits Specified in Section 94522(a)(3).

(1) The ingredients and the amount of each ingredient of all aerosol coating products subject to the provisions of this article shall be determined by the procedures set forth in "Air Resources Board Method 310, Determination of Volatile Organic Compounds (VOC) in Consumer Products," adopted September 25, 1997 and as last amended on July 18, 2001.

(2) Upon written notification from the Executive Officer, the aerosol coating manufacturer shall have 10 working days to provide to the Executive Officer the following information for products selected for testing:

(A) the product category as defined in section 94521(a);

(B) the PWMIR;

(C) the weight fraction of all ingredients including: water, solids, each ROC, and any compounds assigned a MIR value of zero as specified in sections 94522(h), 94700, or 94701 [Each ROC must be reported as an ingredient if it is present in an amount greater than or equal to 0.1 percent by weight of the final aerosol coatings formulation. If an individual ROC 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 following definition does not need to be reported as an ingredient.

For the purpose of this section, an "impurity" means an individual chemical compound present in a raw material which is incorporated into the final aerosol coatings formulation, if the compound is present below the following amounts in the raw material:

(i) for individual compounds that are carcinogens, as defined in 29 CFR section 1910.1200(d)(4), each compound must be present in an amount less than 0.1 percent by weight in order to be considered an "impurity."

(ii) for all other compounds present in a raw material, a compound must be present in an amount less than 1 percent by weight in order to be considered an "impurity"];

(D) any other information necessary to determine the PWMIR of the aerosol coating products to be tested.

(3) Final determination of the PWMIR of the aerosol coatings shall be determined using the information obtained from section 94526(b)(1) and (2).

(c) Exempt Compounds from Products Subject to the VOC Limits Specified in Section 94522(a)(2). Compounds exempt from the definition of VOC shall be analyzed according to the test methods listed below:

(1) the exempt compound content of aerosol coating products shall be determined by "Air Resources Board Method 310, Determination of Volatile

Organic Compounds (VOC) in Consumer Products," adopted September 25, 1997 and as last amended on July 18, 2001, which is incorporated herein by reference.

(2) the following classes of compounds will be analyzed as exempt compounds only if manufacturers specify which individual compounds are used in the product formulations and identify the test methods, which, prior to such analysis, have been approved by the Executive Officer of the ARB, and can be used to quantify the amounts of each exempt compound: cyclic, branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-containing perflurorcarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

(d) Metal Content. The metal content of metallic aerosol coating products shall be determined by South Coast Air Quality Management District (SCAQMD) Test Method 318-95 "Determination of Weight Percent Elemental Metal in Coatings by X-ray Diffraction" July, 1996, which is incorporated herein by reference.

(e) Specular Gloss. Specular gloss of flat and nonflat coatings shall be determined by ASTM Method D-523-89, March 31, 1989, which is incorporated herein by reference.

(f) Acid Content. The acid content of rust converters shall be determined by ASTM Method D-1613-91, "Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products, May 15, 1991, which is incorporated herein by reference.

(g) Lacquers. Lacquer aerosol coating products shall be identified according to the procedures specified in ASTM Method D-5043-90, "Standard Test Methods for Field Identification of Coatings," April 27, 1990, which is incorporated herein by reference.

NOTE: Authority cited: Sections 39600, 39601, 39607, 41511 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 39607, 40000, 41511 and 41712, Health and Safety Code.

REFERENCE

§ 94527. Severability.

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

NOTE: Authority cited: Sections 39600, 39601 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000 and 41712, Health and Safety Code.

REFERENCE

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

§ 94528. Federal Enforceability.

For purposes of federal enforceability of this article, the United States Environmental Protection Agency is not subject to approval determinations made by the Executive Officer under sections 94525 and 94526. Within 180 days of a request from a person who has been granted a variance under Section 94525, a variance meeting the requirements of the Clean Air Act shall be submitted by the Executive Officer to the Environmental Protection Agency for inclusion in the applicable implementation plan approved or promulgated by the Environmental Protection Agency pursuant to Section 110 of the Clean Air Act, 42 U.S.C., Section 7410.

NOTE: Authority cited: Sections 39600, 39601, 39602 and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 39602, 40000 and 41712, Health and Safety Code.

REFERENCE

§ 94700. MIR Values for Compounds.

Organic Compound	MIR Value [Effective Date*]
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
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

Organic Compound	MIR Value [Effective Date*]
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

Organic Compound	MIR Value [Effective Date*]
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
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

Organic Compound	MIR Value [Effective Date*]
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
1,3-Dimethyl Cyclohexane	1.72
Cyclooctane	1.73
Ethylcyclohexane	1.75

Organic Compound	MIR Value [Effective Date*]
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-Pentyl Cyclohexane	0.99
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
Octyl Cyclohexane	0.60
C14 Cycloalkanes	0.71
C15 Bicycloalkanes	0.69

Organic Compound	MIR Value [Effective Date*]
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

Organic Compound	MIR Value [Effective Date*]
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-Pentenes	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-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
Trans-2-Heptene	7.33

Organic Compound	MIR Value [Effective Date*]
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

Organic Compound	MIR Value [Effective Date*]
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

Organic Compound	MIR Value [Effective Date*]
b-Pinene	3.28
d-Limonene (Dipentene or Orange Terpene)	3.99
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
C9 Disubstituted Benzenes	6.61
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

Organic Compound	MIR Value [Effective Date*]
Isomers of Propylbenzene	6.12
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
Indane	3.17
Naphthalene	3.26
Tetralin	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
C13 Disubstituted Naphthalenes	5.08
C13 Trisubstituted Naphthalenes	5.08
C13 Monosubstituted Naphthalenes	3.86
Acetylene	1.25
Methyl Acetylene	6.45
2-Butyne	16.33
Ethyl Acetylene	6.20
Methanol	0.71
Ethanol	1.69

Organic Compound	MIR Value [Effective Date*]
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
Cyclohexanol	2.25
1-Hexanol	2.74
2-Hexanol	2.46
1-Heptanol	2.21
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
Isodecyl Alcohol	1.23
Ethylene Glycol	3.36
Propylene Glycol	2.75
1,2-Butanediol	2.21
Glycerol (1,2,3-Propanetriol)	3.27
1,2-Dihydroxy Hexane	2.75
2-Methyl-2,4-Pentanediol	1.04
Dimethyl Ether	0.93
Trimethylene Oxide	5.22
Dimethoxymethane	1.04
Tetrahydrofuran	4.95
Diethyl Ether	4.01
Alpha-Methyltetrahydrofuran	4.62
Tetrahydropyran	3.81
Ethyl Isopropyl Ether	3.86

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

Organic Compound	MIR Value [Effective Date*]
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
2-Butyl Tetrahydrofuran	2.53
Di-Isobutyl Ether	1.29
Di-n-butyl Ether	3.17
Di-n-Pentyl Ether	2.64
Ethylene Glycol Monomethyl Ether (2-Methoxyethanol)	2.98
Propylene Glycol Monomethyl Ether (1-Methoxy-2-Propanol)	2.62
2-Ethoxyethanol	3.78
2-Methoxy-1-Propanol	3.01
Diethylene Glycol	3.55
Propylene Glycol Monoethyl Ether (1-Ethoxy-2-Propanol)	3.25
Ethylene Glycol Monopropyl Ether (2-Propoxyethanol)	3.52
3-Ethoxy-1-Propanol	4.24
3-Methoxy-1-Butanol	0.97
Diethylene Glycol Methyl Ether [2-(2-Methoxyethoxy) Ethanol]	2.90
Propylene Glycol Monopropyl Ether (1-Propoxy-2-Propanol)	2.86
Ethylene Glycol Monobutyl Ether [2-Butoxyethanol]	2.90
3-Methoxy-3-Methyl-Butanol	1.74
2-(2-Ethoxyethoxy) Ethanol	3.19
Dipropylene Glycol	2.48
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 (1-Methoxy-2-[2-Hydroxypropoxy]-Propane)	2.21
Dipropylene Glycol Methyl Ether Isomer (2-[2-Methoxypropoxy]-1- Propanol)	3.02
2-Hexyloxyethanol	2.45

Organic Compound	MIR Value [Effective Date*]
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
Ethylene Glycol 2-Ethylhexyl Ether [2-(2-Ethylhexyloxy) Ethanol]	1.71
2-[2-(2-Ethoxyethoxy) Ethoxy] Ethanol	2.66
2-(2-Hexyloxyethoxy) Ethanol	2.03
2-[2-(2-Propoxyethoxy) Ethoxy] Ethanol	2.46
2-[2-(2-Butoxyethoxy) Ethoxy] Ethanol	2.24
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-1-Phenylethylhydroperoxide)**	12.61
Methyl Formate	0.06
Ethyl Formate	0.52
Methyl Acetate	0.07
Ethyl Acetate	0.64
Methyl Propionate	0.71
n-Propyl Formate	0.93
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

Organic Compound	MIR Value [Effective Date*]
Butyl Propionate	0.89
Amyl Acetate	0.96
n-Propyl Butyrate	1.17
EEP Solvent (Ethyl 3-Ethoxy Propionate)	3.61
2,3-Dimethylbutyl Acetate	0.84
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
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 Aceate	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

Organic Compound	MIR Value [Effective Date*]
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
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
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 (1-Methoxy-2-Propyl Acetate)	1.71
2-Ethoxyethyl Acetate	1.90
2-Methoxy-1-Propyl Acetate	1.12
Dimethyl Succinate	0.23

Organic Compound	MIR Value [Effective Date*]
Ethylene Glycol Diacetate	0.72
Diisopropyl Carbonate	1.04
Dimethyl Glutarate	0.51
Ethylene Glycol Monobutyl Ether Acetate (2-Butoxyethyl Acetate)	1.67
Dimethyl Adipate	1.95
2-(2-Ethoxyethoxy) Ethyl Acetate	1.50
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
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
2-Ethyl Hexanoic Acid	4.41
Methyl Acrylate	12.24
Vinyl Acetate	3.26
2-Methyl-2-Butene-3-ol (1,2-Dimethylpropyl-1-en-1-ol)	5.12
Ethyl Acrylate	8.78
Methyl Methacrylate	15.84
Butyl Methacrylate	9.09
Isobutyl Methacrylate	8.99
Isobornyl Methacrylate**	8.64

Organic Compound	MIR Value [Effective Date*]
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
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
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

Organic Compound	MIR Value [Effective Date*]
C5 Ketones	3.07
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-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
Biacetyl	20.73
Methylvinyl Ketone	8.73
Hydroxy Acetone	3.08
Methoxy Acetone	2.14
Diacetone Alcohol (4-Hydroxy-4-Methyl-2-Pentanone)	0.68
Phenol	1.82
Alkyl Phenols	2.34
m-Cresol	2.34
p-Cresol	2.34
o-Cresol	2.34

Organic Compound	MIR Value [Effective Date*]
1-Phenoxy-2-Propanol	1.73
Nitrobenzene	0.07
Para Toluene Isocyanate	0.93
Toluene Diisocyanate	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
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
Vinyl Chloride	2.92
Ethyl Chloride	0.25
1,1-Dichloroethane	0.10
1,2-Dichloroethane	0.10

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

Organic Compound	MIR Value [Effective Date*]
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-Cl-Benzene)	0.11
HFC-134a (1,1,1,2-Tetrafluoroethane)**	0.00
HFC-152a (1,1-Difluoroethane)**	0.00
Dimethyl Sulfoxide	6.90
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

* 30 Days after the Regulation is approved by the Office of Administrative Law.

** ULMIR (as defined in section 94521 (a)(71), title 17, California Code of Regulations.)

NOTE: Authority cited: Sections 39600, 39601, and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000, and 41712, Health and Safety Code.

REFERENCE

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

§ 94701. MIR Values for Hydrocarbon Solvents.

(a) Aliphatic Hydrocarbon Solvents

Bin	Average Boiling Point*** (degrees F)	Criteria	MIR Value [Effective Date*]
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

*30 Days after the Regulation is approved by the Office of Administrative Law.

***Average Boiling Point = (Initial Boiling Point + Dry Point) / 2

Division 3. Air Resources Board

Chapter 1. Air Resources Board

Subchapter 8.5 Consumer Products

Article 3. Aerosol Coating Products

(b) Aromatic Hydrocarbon Solvents

Bin	Boiling Range (degrees F)	Criteria	MIR Value [Effective Date*]
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

*30 Days after the Regulation is approved by the Office of Administrative Law.

NOTE: Authority cited: Sections 39600, 39601, and 41712, Health and Safety Code. Reference: Sections 39002, 39600, 40000, and 41712, Health and Safety Code.

REFERENCE

IV.

Use of Photochemical Reactivity as an Ozone Control Approach

A. Introduction

In this Chapter, we provide a description of how we propose to use the science of photochemical reactivity to control reactive organic compound (ROC) emissions from aerosol coatings. In Chapter II of this report, we provided background on the science of photochemical reactivity and the development of numerical scales that allow us to compare the differences in individual ROC reactivity. The potential of using reactivity as a ROC control approach has also been evaluated (Croes *et al*., 1992), and we believe the scientific foundation needed for using reactivity is well-established and readily available. In fact, hydrocarbon reactivity already serves as the basis for a portion of California's Low Emission Vehicle and Clean Fuels Regulation (LEV/CF) (ARB, 1990c). Research has also shown that reactivity-based control strategies have the potential to be a cost-effective approach to improve air quality (Russell *et al*., 1995; McBride *et al*., 1997).

The amendments proposed here would be the first reactivity-based regulation for non-mobile sources. To implement this reactivity-based regulation, we have developed a number of methods to apply the science of photochemical reactivity. These proposals are:

- Using the Maximum Incremental Reactivity (MIR) Scale
- Including Reactive Organic Compounds (ROC) that are Considered "Exempt" in Mass-Based Regulations
- Calculating Upper Limit MIR Values
- Calculating Group MIR Values for Hydrocarbon Solvent Mixtures
- Addressing Uncertainty in the Maximum Incremental Reactivity Scale
- Calculating "Equal Air Quality Benefit" Reactivity Limits

Our goal is to ensure that these amendments will achieve an ozone reduction equivalent to that which would be expected from implementation of the mass-based volatile organic compound (VOC) limits, while providing manufacturers with additional flexibility to achieve our air quality goals.

B. Program Elements

1. Using the Maximum Incremental Reactivity (MIR) Scale

As described in Chapter II, under a given environmental condition, organic compounds differ in their ozone forming abilities. In addition, individual chemicals are emitted into the atmosphere in the presence of other ROCs. These "background" organic compounds may have a modifying effect on a chemical's ozone forming potential (Bowman and Seinfield, 1994; Carter, 1994). In other words, a ROC not only contributes but also affects other compounds' abilities to react to form ozone. Therefore, to control emissions of ROCs, based on their potentials to form ozone, the air quality impact of an individual chemical as well as its effects on other ROCs needs to be assessed. To do this, in these amendments we are proposing to use the concept of MIR. The MIR is a numerical quantity that describes the change in peak ozone levels due to the addition of an organic compound under simulated atmospheric conditions. (Carter, 1994; 1998) (see also Chapter II).

Unlike the reactivity scales derived using the assumption that hydrocarbons occur singly in the atmosphere (see, for example, Bufalini et al., 1976), the MIR approach allows characterization of an individual organic compound's ability to form ozone, as well as its effect on other hydrocarbons (Carter, 1994; 2000). For this rulemaking, a list of over six hundred MIR values of ROC (in units of gram O_3 per gram organic compound) and representative chemical species (for example, branched C7 alkanes) has been compiled. These MIR values combined with emission data can be used to determine the ozone contribution of an individual chemical.

Under this proposal, manufacturers will need to assess the reactivity of their products by using the MIR scale. To do this, each ingredient in an aerosol coating formulation would be assigned its corresponding MIR value (non-ROCs are assigned MIR values of zero). The weight fraction of each ingredient is multiplied by the MIR value to get the "weighted reactivity" of an ingredient. The weighted reactivities of all ingredients are summed to get the product's weighted MIR (in grams ozone/gram product). The "product-weighted" MIR would then be compared to the reactivity limit to determine compliance. To comply, the product-weighted reactivity must be no more than the reactivity limit for the aerosol coating category. An example of how a product's weighted reactivity is calculated is provided in Appendix D.

2. Including "Exempt" Organic Compounds in Reactivity-based Regulations

The current Aerosol Coatings Regulation contains exemptions for "low reactive" VOCs, such as acetone, ethane, perchloroethylene, and parachlorobenzotrifluoride (PCBTF). This regulation essentially uses a reactivity scale of "zero" and "one" i.e. a compound is either exempt or assumed to have the same potential to form ozone as all other VOC compounds. This approach is consistent with that used by the United States Environmental Protection Agency (U.S. EPA) which classifies all VOCs as either

"reactive" or "negligibly reactive" (Dimitriades, 1996). This "bright line" approach is practical for the implementation of mass-based regulations, but does not provide the level of detail to assess all ozone impacts of emitted VOCs.

Although the ability of organic compounds to induce ozone varies over several orders of magnitude (Carter, 2000), significant emissions of a "negligibly reactive" or "exempted VOC" under the current mass-based regulation may have a non-negligible air quality impact. An analysis of the 1997 Aerosol Coating Survey data indicate that the acetone (a "low reactive" exempt VOC) contained in aerosol coatings can change the reactivity of a product by 10 percent or more (ARB, 1998b). This provides evidence that in a reactivity program, the reactivities of low reactive VOCs should be considered with their respective smaller impacts on ozone formation. Hence, in this proposed regulation, all organic ingredients are included in evaluating the ozone forming potential of aerosol coating products.

3. Calculating Upper Limit MIR Values

The majority of ingredients used in aerosol coating products have MIR values available. However, there are several compounds currently used in aerosol coatings for which no published MIR value exists. To allow continued use of these ROCs a methodology for calculating upper limit MIRs was developed (Carter, 2000). This method for estimating the upper maximum incremental reactivity limit has been reviewed by the Reactivity Scientific Advisory Committee (RSAC) and is detailed in Appendix E of this report.

Briefly, the estimation procedure is based on deriving the upper limits of kinetic and mechanistic reactivities. Both of these factors play a critical role in determining the ozone impact of a compound in an air pollution episode (Carter and Atkinson, 1989). Kinetic reactivity is the fraction of a compound that reacts due to different atmospheric loss processes. Its upper limit, which has a maximum value of one, can be estimated using the rates of chemical reactions with different reactive species in the atmosphere (e.g. hydroxyl (OH) radicals). The number of ozone molecules formed for each molecule of ROC reacted is known as mechanistic reactivity. For determining the upper limit mechanistic reactivity of both photo- and non photo-reactive compounds, empirical relationships based on carbon number of a molecule or its hydroxyl radical reaction rate constant are established (Carter, 2000). The maximum incremental reactivity can be obtained by multiplying the upper limit estimates of kinetic reactivity and mechanistic reactivity.

4. Calculating Group MIR Values for Hydrocarbon Solvent Mixtures

Hydrocarbon solvents (HCS) are complex mixtures of organic compounds, which include alkanes, branched alkanes, cycloalkanes, and aromatics. Because different processes are used in their productions, these HCS have different compositions (CMA, 1997). Based on their chemical ingredients, HCS can be classified into aromatic and

aliphatic solvents. Aromatic HCS are solvent mixtures containing approximately 100 percent of substituted monocyclic (i.e. single ring) and/or polycyclic (multiple rings) aromatic compounds. Aliphatic HCS are predominately saturated hydrocarbons, with maximum aromatic contents ranging from 2 to 22 percent by volume (see, for example, ASTM, 1995, CMA, 1997). Depending on their applications, different generic names are given to these aliphatic HCS, with "mineral spirit" being among the most commonly used name for those used in coatings industries (ASTM, 1995). Therefore, for evaluating the ozone formation potential of aerosol coating products, the ability to understand the reactivity of HCS is needed.

The reactivity of complex mixtures, such as HCS, can be calculated by combining each ingredient's MIR and its corresponding weight percentage (see for example, Chang and Rudy, 1990; McNair *et al*., 1992). While computational methods exist for determining the MIR value of a chemical (see above), the detailed chemical speciation (i.e. ingredients) data needed for such a calculation may not be available for all HCS. To overcome this, if solvents can be assigned to a group, speciation profiles of selected or "typical" solvents may then be used for calculating a group reactivity. At present, however, there is no solvent categorization method available, although grouping criteria such as chemical abstract service (CAS) number, boiling ranges, and aromatic contents have been proposed.

To address the need, we have developed a categorization ("binning") methodology for hydrocarbon solvents. The procedure is detailed in the manuscript titled "Methods for Estimating Maximum Incremental Reactivity (MIR) of Hydrocarbon Solvents and Their Classification" (Kwok *et al*., 2000) and is included as Appendix C of this report. Briefly, the hydrocarbon solvent classification scheme was developed by assuming that the overall HCS MIR can be estimated by summing the reactivity contribution from individual chemical classes. For hydrocarbon solvent mixtures composed of *n*-alkanes, branched alkanes, cycloalkanes, and mono-, di-, poly-substituted benzenes, the total MIR of a solvent mixture is then given by:

HCS MIR = Sum of % Wt MIR of all straight-chain alkanes
+ Sum of % Wt MIR of all branched alkanes
+ Sum of % Wt MIR of all cycloalkanes
+ Sum of % Wt MIR of all mono-substituted benzenes
+ Sum of % Wt MIR of all di-substituted benzenes
+ Sum of % Wt MIR of all poly-substituted benzenes

where % Wt = percent composition weighted.

To simplify the above equation, data suggest that for a given carbon number, the MIR values are relatively insensitive to the position of the substituent groups (see, for example, Carter, 2000). In addition, MIR values of C_{n-1}, C_n, and C_{n+1} homologs are similar (Carter, 2000), and hydrocarbon solvent mixtures have rather narrow carbon

number distributions (see for example, Carter *et al*., 1997). Hence, the composition weighted (% Wt.) MIR of all compounds can be approximated by, for example, for branched (Br) alkanes:

Sum of % Wt MIR of all branched alkanes
= MIR of a Br-alkane
x total Wt % of Br-alkanes in the mixture

In other words, for a chemical class, the reactivity of all chemical species is similar, and a single species can be used to determine the reactivity contribution of the entire chemical class. Thus, the MIR of a complex HCS mixture can be calculated by using a simple n-alkane-branched-alkane-cycloalkane-aromatics mixture (i.e. surrogate mixture). Results from our analysis indicated that, in general, carbon number distribution of a HCS peaks at its average-boiling point, which is defined as the sum of initial boiling point (IBP) plus dry point (DP) divided by two. This relationship was used to identify the surrogate species of each chemical class. To validate these assumptions, solvent reactivities calculated using the surrogate mixture approach were tested against the HCS reactivity data reported by the solvent manufacturing industry. Based on this comparison, over 90 percent of the solvents tested have estimated and reported reactivity values that mostly differed by no more than a factor of 15 percent. This result shows that a surrogate mixture can be used for representing complex HCS for reactivity determinations.

In developing a way to group HCS of similar reactivity, it is important to ensure that the MIR value assigned for the group reliably reflects the reactivity of a particular HCS mixture within the group. Using the surrogate mixture procedure developed, calculations were performed to determine the effects of hydrocarbon composition (i.e. relative percentages of *n*-alkanes, branched alkanes, cycloalkanes, and aromatics) and carbon number (as a function of boiling point) on a mixture's MIR value. Our results indicate that, up to a certain temperature range, solvent composition has only a minor effect on the mixture MIR value. Using a surrogate mixture MIR's coefficients of variation of 15 percent as a grouping criterion, we have developed four HCS reactivity groups over the average boiling point of 80-580 ^{o}F. This temperature range is consistent with the existing HCS data. Within each group, five different sub-groups are defined according to their dominant chemical ingredients. The aromatic content of these solvents is classified according to the American Society of Testing and Materials method (ASTM, 1995).

To assist aerosol coating formulators with applying this HCS classification scheme, typical solvent sales specification data such as mid-boiling range, percent total alkanes and isoalkanes, cyclolkanes and aromatics are used as categorization criteria. Table IV-1 lists all twenty aliphatic hydrocarbon solvent bins and their corresponding group MIR values. In most cases (~70 percent), the assigned MIR is approximately ± 15 percent of the reported values, and only a few (~ 7 percent) have a discrepancy between the assigned and reported values greater than 30 percent.

TABLE IV-1
PROPOSED DRAFT APPROACH FOR ASSIGNING MIR VALUES TO ALIPHATIC HYDROCARBON SOLVENTS

Average BP (oF)	CRITERIA	MIR (g O3/g Organics)	BIN NO.
80-205	ALKANES (< 2% AROMATICS)	2.08	1
	N- & ISO-ALKANES (≥ 90% & < 2% AROMATICS)	1.59	2
	CYCLO-ALKANES (≥ 90% & < 2% AROMATICS)	2.52	3
	ALKANES (2 to < 8% AROMATICS)	2.24	4
	ALKANES (8 to 22% AROMATICS)	2.56	5
> 205-340	ALKANES (< 2% AROMATICS)	1.41	6
	N- & ISO-ALKANES (≥ 90% & < 2% AROMATICS)	1.17	7
	CYCLO-ALKANES (≥ 90% & < 2% AROMATICS)	1.65	8
	ALKANES (2 to < 8% AROMATICS)	1.62	9
	ALKANES (8 to 22% AROMATICS)	2.03	10
> 340-460	ALKANES (< 2% AROMATICS)	0.91	11
	N- & ISO-ALKANES (≥ 90% & < 2% AROMATICS)	0.81	12
	CYCLO-ALKANES (≥ 90% & < 2% AROMATICS)	1.01	13
	ALKANES (2 to < 8% AROMATICS)	1.21	14
	ALKANES (8 to 22% AROMATICS)	1.82	15
> 460-580	ALKANES (< 2% AROMATICS)	0.57	16
	N- & ISO-ALKANES (≥ 90% & < 2% AROMATICS)	0.51	17
	CYCLO-ALKANES (≥ 90% & < 2% AROMATICS)	0.63	18
	ALKANES (2 to < 8% AROMATICS)	0.88	19
	ALKANES (8 to 22% AROMATICS)	1.49	20

TABLE IV-2
PROPOSED DRAFT APPROACH FOR ASSIGNING MIR VALUES TO AROMATIC HYDROCARBON SOLVENTS

Boiling Range (oF)	CRITERIA	MIR (g O3/g Organics)	BIN NO.
280-290	100% AROMATICS	7.37	21
320-350	100% AROMATICS	7.51	22
355-420	100% AROMATICS	8.07	23
450-535	100% AROMATICS	5.00	24

For aromatic hydrocarbon solvents, the speciation data are scarce, and the surrogate mixture approach was not used for determining the solvent reactivity. Hence, the aromatic HCS classification scheme was constructed based on the boiling range and is presented in Table IV-2 (Bin 21-24).

5. Addressing Uncertainty in the Maximum Incremental Reactivity Scale

As described in Chapter II, there are uncertainties associated with reactivity scales such as the MIR. Therefore, to apply reactivity as a control approach, we believe that most of the ROCs used in the category proposed for regulation need to consist of well-characterized compounds (i.e. with "certain" MIR values). In addition, a method to account for MIR value uncertainty is needed. In the aerosol coatings category, over 80 percent of ROCs used are well-studied and an additional 17 percent of the inventory (i.e. hydrocarbon solvents) would need only a minor adjustment for uncertainty. In other words, over 95 percent of the ROCs used in aerosol coatings are fairly well-characterized in terms of their reactivity. Nevertheless, to ensure that the total air quality benefit is achieved, we believe uncertainty factors should still be applied when appropriate. Below we describe our proposal for using uncertainty "factors" in the proposed amendments.

Based on the analysis in Chapter II, we concluded that for regulatory applications uncertainty adjustments should be tied to the individual compound. Therefore, following the recommendation of Dr. Carter and using his uncertainty "bin" assignments, we are proposing to apply uncertainty factors to individual compounds. For our proposed amendments to the Aerosol Coatings Regulation, we propose to apply an uncertainty factor of 1.0 to compounds classified within uncertainty bins one and two; a factor of 1.25 to compounds in bin three; a factor of 1.5 to compounds in bin four; and a factor of 2.0 for compounds in bins five and six.

Organic compounds in uncertainty bins one and two are compounds which have been studied extensively (in most cases) in the laboratory, and their ozone forming ability can be reasonably described by the chemical mechanism developed. Hence, no adjustment is recommended for bin one and two chemicals. As mentioned previously, over 80 percent (on a weight basis) of ROCs used in aerosol coatings would fall into bins one and two. Bin three chemicals, constitute two percent of compounds used in aerosol coatings (ARB, 1998b). These chemicals, in general, have lesser amounts of experimental data available, and a slight change to the MIR value could occur when the chemical mechanism is refined in the future. Because of this, an adjustment factor of 1.25 is proposed.

Bin four chemicals, include "generic" species representing the reactivity of a group of chemicals. The higher adjustment factor recommended for bin four chemicals (i.e. 1.5 compared to 1.25 for bin three) is consistent with the lack of experimental data for this group. However, less than one percent of compounds reported in the 1997 survey would fall into bin four (ARB, 1998b). Although some chemicals in bins five and six have been tested under laboratory conditions, the modeling results are not conclusive.

Hence, an uncertainty factor of 2.0 is proposed. Less than one percent of aerosol coating ROCs reported in the survey fall into bins five and six (ARB, 1998b).

For hydrocarbon solvent MIRs shown in Table IV-1 and II, an uncertainty factor of 1.15 is proposed. By proposing this factor, we are assuming that the HCS table MIR values provide a reliable description of the "true" solvent's reactivity. The adjustment factor proposed is to account for the need to "bin" HCS into groups as described earlier. For estimated MIR values (i.e. upper limit MIRs), no adjustment factor is proposed as the method used infers the highest reactivity of the chemical.

ARB staff recognizes that for compounds with uncertain MIR values it is likely that, upon further study, the MIR value for an individual compound may increase or may decrease. However, to ensure the air quality benefit, staff is proposing to increase the reported MIR value by multiplying it by the uncertainty factor. This conservative approach preserves the air quality benefit.

Uncertainty factors can be applied in two ways. MIR values can be adjusted when calculating the reactivity limit or can be adjusted when manufacturers determine the reactivity of their products. Either approach should preserve the air quality benefit. Both proposals were presented to the aerosol coatings industry and their preference was to apply uncertainty factors to calculation of the reactivity limit. In this way manufacturers can determine the reactivity of their products by using the MIR values as they appear in the Tables of MIR values.

6. Calculating "Equal Air Quality Benefit" Reactivity Limits

In this rulemaking, we are proposing to replace the January 1, 2002, mass-based aerosol coating VOC limits with equivalent reactivity limits. For aerosol coatings, because a mass-based reduction has already been claimed we need to ensure this commitment will be met. Hence, a common basis is needed to compare the air quality benefit from mass-based versus reactivity-based control, which in this case, is the amount of ozone reduction to be achieved. Based on the premise of providing an equal air quality benefit, the proposed methodology is designed to develop a reactivity limit that will match the amount of ozone reductions associated with implementation of the mass-based standards.

The calculation involves two simple steps. Step one is to determine the amount of ozone reduction that would be achieved from the mass-based VOC reduction. The reactivity limit is then set using an iterative process until the target ozone reduction is matched. The sales and VOC content data relied upon for this rulemaking are obtained from the Air Resources Board 1997 Aerosol Coating Product Survey (ARB, 1998b). These procedures are detailed below.

To calculate the ozone reduction achieved by the mass-based limits, we assumed that the average reactivity of all VOCs used in a particular aerosol coating product category could be represented by an overall sales-weighted average maximum

incremental reactivity ($SWA\text{-}MIR_{VOC}$) (in units of g O_3/g organics). In other words, this metric describes the ozone formation potential contributed by the VOCs. This can be expressed in the following equation:

$$SWA\text{-}MIR_{VOC} = SWA\text{-}MIR_{prod} / SWA\text{-}VOC, \qquad (1)$$

Where:

$SWA\text{-}MIR_{prod}$	=	Sales-weighted average product MIR
	=	Summation of the products' individual reactivities multiplied by their individual sales divided by the summation of the sales in the product category
SWA-VOC	=	Sales-weighted average VOC
	=	Summation of the products' individual VOC contents multiplied by their individual sales divided by the summation of the sales in the product category.

Under the mass-based regulation, ozone reductions would only be achieved from the reduction of non-exempted VOC emissions. The total amount of ozone reduction from the mass-based control then, would be equal to the $SWA\text{-}MIR_{VOC}$ multiplied by the total amount of non-exempted VOCs ($VOC_{non\text{-}exempt}$) exceeding the particular VOC limit (VOC_{limit}).

Ozone Reduction from an Aerosol Coatings Product Category

$$= SWA\text{-}MIR_{VOC} \times (VOC_{non\text{-}exempt} - VOC_{limit}) \qquad (2)$$

In the calculation described above, the MIR values of individual ROCs have been adjusted for uncertainty based on our proposal described earlier in this Chapter. We believe that the application of adjustment factors in determining the target ozone reduction is a necessary conservative approach to ensure that the full ozone reduction is achieved.

Once the target ozone reduction is determined, the reactivity limit is calculated using the following procedures. The existing product reactivity (PWMIR) (in units of g O_3/g product) is calculated using its ingredient information and the unadjusted MIR values of all ingredients (non-ROC s are assigned MIR values of zero). A trial or arbitrary limit is then set. For those products with reactivity greater than the trial limit, the amount of ozone reduced due to the "reactivity reduction" is calculated by the following equation:

$$\text{Ozone Reduction} = (\text{PWMIR} - \text{“Limit”}) \times \text{Sales} \qquad (3)$$

This step is then repeated for all "non-complying" products, and the expected ozone reduction from the trial limit applied to each product are summed. The total ozone reduction is calculated for each trial limit (i.e. iteration) and is repeated until it equals the mass-based target ozone reduction. The VOC reduction, adjusted SWA-MIR_{VOC}, and target ozone reduction (i.e. adjusted equivalent ozone reduction) for all categories are listed in Chapter IX, Tables IX-1 through IX-16.

The advantage of this "trial-and-error" method is that it allows products with more reactive organic compounds to be "selectively" controlled. This is because the product's reactivity is evaluated based on its entire formulation. This is believed to be a more appropriate method for evaluating air quality benefits using ROC substitution (Carter, 1999). In addition, using this method, no assumptions are made regarding future product ingredients and ROC contents in this computational exercise. Therefore, the results obtained will reliably reflect the air quality benefit expected from the reactivity-based regulation.

REFERENCES

Air Resources Board. (1990c), Proposed regulation for low emission vehicles and clean fuels- Staff report and technical support document, California Air Resources Board, Sacramento Ca, August 13, 1990.

Air Resources Board. (1998b), Aerosol Coating Product Survey. November 25, 1997.

ASTM. (1995), Standard specification for mineral spirits (petroleum spirits)(hydrocarbon dry cleaning solvent). *American Society of Testing and Material*, D-235-95.

Bowman, F.M. and Seinfeld, J.H. (1994), Fundamental basis of incremental reactivities of organic in ozone formation in VOC/Nox mixtures. *Atmos. Environ*. 28. 3359 - 3368.

Bufalini J.J., Walter, T.A., and Bufalini, M.M. (1976), Ozone formation potential of organic compounds. *Environ. Sci. Technol*., 10, 908-912.

Carter, W.P.L. (1994), Development of ozone reactivity scales for volatile organic compounds. *J. Air & Waste Manage. Assoc*., 44, 881-899.

Carter, W.P.L., Luo, D, and Malkina, I.L. (1997), *Investigation of the atmospheric ozone formation potentials of selected mineral spirits samples.* Final Report to Safety-Kleen Corporation.

Carter, W.P.L. (1998), *Development and application of an up-to-date photochemical mechanism for airshed modeling and reactivity assessment*. Final report to California Air Resources Board, Contract No. A932-094.

Carter, W.P.L. (2000), *Documentation of the SAPRC-99 chemical mechanism for VOC reactivity assessment.* Final report to California Air Resources Board, Contract No. 92-329 and No. 95-308.

Carter and Atkinson (1989), Computer modeling study of incremental hydrocarbon reactivity. *Environ. Sci. Technol*., 23, 864-880.

Chang, T.Y., and Rudy, S.J. (1990), Ozone-forming potential of organic emissions from alternative-fueled vehicles. *Atmos. Environ*., 24A, 2421-2430.

Chemical Manufacturers Association (CMA) (1997), *VOC reactivity and hydrocarbon solvents. Hydrocarbon Solvent Panel*, CMA presentation to California Air Resources Board, January 22, 1997.

Croes, B.E., Holmes, J.R., and Llyod, A.C. (1992), Reactivity-based hydrocarbon controls: scientific issues and potential regulatory applications. *J. Air & Waste Manage.*, 42, 657-661.

Dimitriades, B. (1996), Scientific basis for the VOC reactivity issues raised by section 183(e) of the clean air act amendments of 1990. *J. Air & Waste Manage. Assoc.*, 46, 963-970.

Kwok, E.S.C., Chew, A. and Takemoto, C. (2000), Methods for estimating maximum incremental reactivity (MIR) of hydrocarbon solvents and their classification. Technical Evaluation Section, Stationary Sources Division, California Air Resources Board.

McBride S. J., Oravetz, M.A., and Rusell, A.G. (1997), Cost-Benefit and uncertainty issues in using organic reactivity to regulate urban ozone. *Environ. Sci. Technol*., 31, 238A-244A.

McNair, L., Russell, A., and Odman, M.T. (1992), Airshed calculation of the sensitivity of pollutant formation to organic compound classes and oxygenates associated with alternative fuels. *J. Air & Waste Manage. Assoc*., 42, 174-178.

Russell, A., Milford, J., Bergin, M.S., McBride, S., McNair, L., Yang, Y., Stockwell, W.R., and Croes, B. (1995), Urban ozone control and atmospheric reactivity of organic gases. *Science*, 269, 491-495.

Successfully Creating a Reactivity-Based Program for Control of VOCs in Consumer Products and Coatings

American Solvents Council of the American Chemistry Council

Overview

- Concept of relative photochemical reactivity
- Limitations of mass-based programs in regulating formulated products
- Potential benefits of reactivity-based programs
- California's aerosol coatings Rule: The reactivity-based approach in action
- Conclusion

What is Photochemical Reactivity?

Photochemical reactivity is a measure of the potential of a given compound to contribute to ozone levels in the troposphere (lower atmosphere).

What is Relative Photochemical Reactivity?

- Some VOCs have greater impact on ozone levels than others. For example:
  - A gram of VOC “A” → less than 0.1 gram of ozone
  - A gram of VOC “B” →more than 10 grams of ozone

  While the mass of both VOCs are equal, VOC “B” contributes 100 times more to ozone accumulation.

- *Relative photochemical reactivity* measures on a common scale the change in the amount of ozone in the atmosphere as a result of an incremental change in amount of a given VOC (usually expressed in grams of ozone per gram of VOC).

Focus of This Presentation

This presentation explores mass-based approaches and considers how reactivity-based approaches might be used to improve the regulation of VOCs.

What the Presentation will Demonstrate

- In many instances, relative reactivity can be used to improve regulatory strategies:
  - Can yield greater environmental benefits by encouraging use of lower reactivity ingredients.
  - Can impose less burden and cost on product manufacturers and the public.
  - Will make possible the effective measurement and regulation of VOC reactivity with available scientific technologies.

Limits of Mass-Based Programs for Regulating Formulated Products

- Do not consider each VOC's relative potential to contribute to the accumulation of ozone.
- Treat all non-exempt VOC emissions alike, although their potential contributions to the accumulation of ozone vary greatly.
- Can result in performance problems if VOC content is "squeezed" too hard.
- If a coating has to be applied more often, or if a cleaner has to be used in greater quantities, the benefits of new formulations are reduced – more likely to be an issue with mass-based programs.

Mass-Based Programs Can Lead to Use of More Highly Reactive VOCs

- Tighter mass-based limits may cause formulators to use solvents that are more effective but also more photochemically reactive.
- This happened in California, and was one reason CARB adopted a relative reactivity approach for its aerosol coatings regulation.
- The end result of a mass-based limit may be that ozone impact actually increases.

Theoretical Reformulation Example

- Two formulations with similar VOC content can have very different ozone creation potentials.
- The alternative formulation in this example results in a 63% reduction in theoretical ozone generation:

Acrylic Resin Top Coat for Industrial Maintenance Formulation by %[1]

Component	Control	Alternative
MEK	25	
Xylene	40	
PM Acetate	10	
Butyl Acetate	25	53
Ethyl Acetate		15
Methyl Propyl Ketone		23
Amyl Acetate		9
Environmental Impact		
VOC, g/L Solvent	216	214
MIR, g Ozone/g VOC	3.68	1.36
Ozone Created, grams	795	291

1. Pigment/Binder Ratio = 0.5
   Resin = 50%, Pigment = 25%, Solvent = 25%

Another Theoretical Reformulation Example

- Here, a 22 % reduction in mass nevertheless yields ***almost double*** the reactivity:

Alkyd Top Coat for Industrial Maintenance Formulation by %[1]

Component	Resin #1, 40% Total Solids [2]	Resin #2, 60% Total Solids [3]
Regular Mineral Spirits	100	
C9 Aromatic		28
EEP		72
Environmental Impact		
VOC, g/L Solvent	474	370
MIR, g Ozone/g VOC	1.82	4.70
Ozone Created, grams	863	1741

1. Pigment/Binder Ratio = 0.5
2. Resin = 27%, Pigment = 13%, Solvent = 60%
3. Resin = 40%, Pigment = 20%, Solvent = 40%

Mass-Based Approaches Provide No Incentive for Use of Less Reactive VOCs

- VOCs with “high” relative reactivity are treated the same as VOCs with “low” reactivity (provided they are not exempt).

- Companies have no incentive to switch from highly-reactive compounds to compounds with low reactivity.

Mass-Based Approaches May Not Result in Optimal Air Protection

- Mass-based approaches give equal ‘credit’ for emissions reductions that do not provide equal benefits.
- Actual environmental impact depends on which VOC is reduced or eliminated, and if a new VOC is introduced, how its relative reactivity compares to that of what has been replaced.
- The result is that we often don’t really know how much the regulation accomplishes and if true “reasonable further progress” is being made.

Reactivity-Based Regulation

- Individual compounds are assessed on a more accurate indicator of potential ozone-level impact.
- Similar compounds are not treated differently (*i.e.*, currently compounds with slightly higher reactivity are not exempt while those with slightly lower reactivity than ethane are exempt).
- Vastly different compounds (very high reactivity vs. relatively low reactivity) are no longer treated alike.

Reactivity-Based Regulation

- Regulators can predict the effect of new requirements more accurately, based on a more accurate indicator of each compound's potential impact on ozone levels.

- Regulators will have greater confidence that the potential ozone-impact of a product formulation has actually been reduced.

- Product formulators have an incentive to develop new formulations by substituting less reactive VOCs for more highly reactive VOCs.

- Reactivity-based approaches allow for prioritization among product categories and for direction of research towards emissions with the greatest potential ozone impacts.

Genesis of California's Reactivity-Based Regulation

- As far back as the mid-1960s, California regulated on the basis of reactivity, particularly in the Los Angeles area (known as the 66/3 rules).
- In 1991, California took into account VOC reactivity in part of a regulation intended to reduce VOC emissions by mass from motor vehicles.
- In 1995, California's Air Resources Board (CARB) adopted statewide regulation limiting the VOC mass content of 35 categories of aerosol coatings.
- By 2000, CARB sought to reduce VOC emissions further by instituting relative reactivity limits.

The California Aerosol Coatings Rule

- In 2000, as part of California's SIP for ozone under the federal CAA, CARB first sought to switch the baseline by which it measures acceptable limits of VOCs in aerosol coatings from weight to relative photochemical reactivity.
- In part, CARB adopted the Rule on the basis that manufacturers, under the mass-based approach, were switching from higher masses of VOCs with low reactivity to lower masses of VOCs with higher reactivity – a counterproductive effect.
- CARB sent the Rule to the EPA for approval in 2002.
- The EPA proposed in January 2005 the approval of CARB's regulation.

Applicability

- The California Rule applies to:
  - Aerosol coatings
  - Aerosol clear coatings
  - Aerosol stains
  - Any person who sells, supplies, offers for sale, applies or manufactures for use in CA any of these aerosol coatings

Defining VOCs

- CARB's Aerosol Coatings Rule includes all compounds that have the potential, once emitted, to contribute to ozone formation in the troposphere.

- Even those VOCs exempted by the EPA under federal law are included.

- *Terminology Note*: Under the Rule, CARB defines this broadened set of VOCs as "Reactive Organic Compounds" (ROCs).

Defining Maximum Incremental Reactivity

- CARB chose the MIR as the standard for photochemical reactivity.

- The MIR is the maximum change in weight of ozone formed by adding a compound to the “Base ROG Mixture” (a controlled mix of reactive organic gases used to derive the MIR scale), per weight of compound added, expressed to hundredths of a gram.

Reliability of the MIR Standard

- The MIR scale is designed on the basis of certain assumptions about meteorological and environmental conditions where ozone is most sensitive to changes in hydrocarbon emissions.
- MIR scale may not be perfectly suited for all geographic areas.
- CARB will review the tables of MIR values every 18 months to determine if modifications are warranted.

Mechanics of §94522(a)(3) of CARB's Aerosol Coatings Rule

- The Rule provides a table of limits for both general coatings and specialty coatings.
- The new limits list each aerosol coating category with an appropriate product-weighted MIR (the sum of all weighted-MIR for all ingredients in a covered coating) in grams of ozone per gram of product (g O_3 / g product).
- For example, metallic coatings in general may not exceed 1.90 g O_3 / g product. Auto body primers may not exceed 1.55 g O_3 / g product.

Hydrocarbon Solvents Bins (§94701)

- Classifies complex hydrocarbon solvents into 24 bins
- 20 bins for aliphatic solvents, based on:
  - Boiling range,
  - Aromatic content (<2%, 2-<8%, 8-22%),
  - Aliphatic isomer content (= 90% n- and iso- or cyclo)
- 4 bins for aromatic solvents (=98%) based on boiling range.
- Individual hydrocarbons (e.g. toluene) not binned.

Outright Prohibitions

- CARB's Aerosol Coatings Rule prohibits the use of products containing several toxic air contaminants (§94522(c)(2)(a)):
  - Methylene Chloride
  - Trichloroethylene
  - Perchloroethylene
  - Stratospheric Ozone-Depleting Substances (as identified by the EPA in 40 CFR Part 82, Subpart A).

Labeling Requirements

- Apply to both manufacturers and responsible party for each aerosol coating product (§94524(b)(1)).
- Must include:
  - Applicable reactivity limit for each product
  - Aerosol coating category (or an abbreviation)
  - Day, month and year in which the product was manufactured.
- Information must be readily observable without removing or disassembling the product or packaging.

Reporting Requirements

- Responsible parties must report to CARB within 90 days:
  - Company name
  - Mail address
  - Contact person and telephone number
  - The above information of the manufacturer (if the responsible party did not also manufacture the covering)
- Upon 90 days written notice, each manufacturer or responsible party must report:
  - Product's brand name
  - A copy of the product label
  - Owner of trademark and brand names
  - Product category as defined in §94521
  - Annual CA sales in pounds per year and the method used to calculate sales
  - Product formulation data
  - Identification as "household," "industrial," or "both"

Variance Provisions

- CARB allows parties to apply in writing for a variance from the Rule, but only upon the following conditions:
  - Requiring compliance would result in extraordinary economic hardship because of reasons beyond the reasonable control of the applicant.
  - The public interest in mitigating the extraordinary hardship to the applicant outweighs the interest in avoiding any increased emissions of air contaminants which would result from issuing the variance.
  - The compliance report proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

Compliance and Testing

- §94526 provides that compliance with the Rule will be determined by using CARB Method 310.
- Only those components with concentration equal to or greater than 0.1 percent will be reported.
- Impurities (chemicals present in a raw material that are incorporated into formulation) can be present only at very small levels – less than 0.1 percent (by weight) for carcinogens and less than 1 percent for all other compounds.

Benefits of CARB's Aerosol Coatings Rule

- CARB estimates the new Aerosol Coatings Rule will result in greater air quality benefit than the mass-based approach.
- By shifting to a reactivity-based system, the Rule encourages manufacturers to shift to solvent formulations with relatively less reactive VOCs.
- By including previously exempted VOCs, coatings limits will be more precise.

Confidential Business Information and Record-Keeping Issues

- The Aerosol Coatings rule will require manufacturers to list publicly the specific proportions of each VOC.

- Manufacturers will not be required, however, to list non-reactive components of their coatings (*e.g.*, solids and resins).

EPA Approval

- The EPA proposed approval of CARB's Aerosol Coverings Rule in January 2005.

- The EPA also proposed revising its definition of VOCs so that previously-exempt compounds (*i.e.*, those with less reactivity than ethane) will now count toward the product's reactivity-based VOC limit for the purpose of CARB's Rule (exemption still applies for all other purposes).

Conclusion

- In many formulated applications, mass-based approaches to VOC regulation are limited in their ability to sharply target and reduce ground-level ozone.
- Reactivity-based approaches provide a more nuanced and refined means of reducing ozone levels.
- California's Aerosol Coatings Rule demonstrates the applicability and efficacy of reactivity-based approaches.

American Solvents Council Members

- Dow Chemical Company
- ExxonMobil Chemical Company
- Shell Chemical LP
- Eastman Chemical Company
- Sasol North America, Incorporated
- Lyondell Chemical Company
- CITGO Petroleum Corporation

September 6, 2005

Robert Heil
NJDEP VOC Work Group Leader
New Jersey Department of Environmental Protection

Dear Mr. Heil and the Members of the Air VOC Work Group:

I have been following the work conducted by this Work Group with great interest and I appreciate your willingness to allow me to participate by telephone.

Since our last meeting, there has been an important regulatory development that will significantly impact the regulation of consumer products, specifically aerosol coatings.

In mid-August, EPA attended a meeting of trade association executives and announced that EPA would pursue a national rule for aerosol coatings under Section 183(e) of the Clean Air Act. The proposed national rule will be modeled after the reactivity regulation in California -- "Regulation for Reducing the Ozone Formed from Aerosol Coating Product Emissions" at Title 17 CCR, Article 3, Sections 94521 – 94524, 94526. EPA expects to begin the rulemaking administrative process in mid-October 2005 and is hopeful that the aerosol coatings rulemaking will proceed quickly.

In light of this information and because the state of New Jersey will benefit from adoption of a national regulation for aerosol coatings in that emission reduction credits will be available for inclusion in the SIP, I respectfully urge the Air VOC Work Group to recognize this fact in its report by noting that the US EPA will adopt a national reactivity regulation for aerosol coatings and noting that it will not be necessary for the state of New Jersey to duplicate the work efforts of the federal agency as emission reduction credits for this activity will available for the states once the rule is adopted and enforceable.

I have attached the PowerPoint presentation from Bruce Moore, Emission Standards Division, Office of Air Quality Planning and Standards at Research Triangle Park, which served as the platform for this announcement. Quite frankly, this announcement is welcomed by the aerosol coatings industry as we had requested this action from EPA. We believe that a national regulation for aerosol coatings, based upon the California reactivity model, is the best and prudent course for controlling ozone formation from these products. We also believe that a national regulation is the best and prudent course

1500 Rhode Island Avenue, NW • Washington, DC 20005-5597 • Phone: 202/462-6272• Fax 202/462-8549 •
Email: members@paint.org (NPCA members); or npca@paint.org (general public) • Web Site: www.paint.org

for maintaining compliance within the industry as a patchwork of state regulations will only create confusion in the supply chain and a paperwork nightmare for the manufacturers.

I look forward to talking with you more about this issue and participating in the activities of the Air VOC Work Group. I will be participating in the meeting tomorrow by telephone and will be happy to answer any questions from the workgroup. If you have any questions at all, please do not hesitate to contact me.

Best regards,

Heidi K. McAuliffe
Counsel, Government Affairs

U.S. Measures to Control VOC Emissions from Consumer and Commercial Products

Bruce Moore
US Environmental Protection Agency

Presentation for Hong Kong Government

Washington, DC
August 18, 2004

Overview

- Background on US VOC control efforts
- Consumer and commercial products under the Clean Air Act amendments of 1990
- Coincidental control of VOC and HAP
- Current status and future outlook

Controlling Ozone Formation

- EPA set health-based national ambient air quality standards (NAAQS) for ozone
- VOC controls have been a key element in attaining the ozone NAAQS
  - New source performance standards (NSPS)
  - Control techniques guidelines (CTG)

New Source Performance Standards (NSPS)

- Federal regulations that apply nationwide only to new, modified, or reconstructed sources in specific source categories
- Enforcement may be delegated to States

Control Techniques Guidelines

- EPA first issued CTGs in 1976 to address specific source categories
  - CTGs established reasonably available control technology (RACT) to apply to new and existing sources
  - RACT is defined as “the lowest possible emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available, considering technological and economic feasibility”

The Significance of CTGs

- CTGs are not federal regulations but are federally prescribed measures to be incorporated as part of approved State Implementation Plans (SIPs)
  - In order for a SIP to be approved by EPA, it must incorporate State and/or local rules that implement the RACT limits prescribed by the CTGs
  - To date, over 30 CTGs have been published covering a variety of surface coating, chemical manufacturing, and material handling operations

Years Later, the Problem Remained

- 1989 Congressional Office of Technology Assessment (OTA) report, "*Catching Our Breath – Next Steps for Reducing Urban Ozone,*" concluded that:
  - Most mobile sources and large stationary VOC sources had been addressed
  - Individually small, dispersed VOC sources collectively contributed substantially to ozone formation
  - Consumer & commercial products remained as a significant source of unregulated emissions

Clean Air Act of 1990

- Section 183(e): “Control of Emissions from Certain Sources” – consumer & commercial products (CCP)
  - Defined CCP as “any substance, product (including paints, coatings, and solvents), or article (including any container or packaging) held by any person, the use, consumption, storage, disposal, destruction, or decomposition of which may result in the release of volatile organic compounds.”
  - Excludes fuels, fuel additives regulated under Section 211; and motor vehicles, non-road vehicles, and non-road engines regulated under Section 216

Requirements of Section 183(e)

- Study VOC emissions from CCP
  - Determine potential of CCP to contribute to ozone nonattainment
  - Establish criteria for regulating CCP
- Submit a Report to Congress

Requirements of Section 183(e)

- List categories for regulation
  - Account for at least 80% of CCP emissions in ozone nonattainment areas
  - Set priorities for regulating based on criteria
- Regulate listed categories

Completed Categories

- “Household” consumer products
- Shipbuilding and repair coatings
- Aerospace coatings
- Architectural coatings
- Automobile refinish coatings
- Wood furniture coatings

Categories Remaining

- Flexible package printing materials
- Aerosol spray paints
- Industrial cleaning solvents
- Flat wood paneling coatings
- Lithographic printing materials
- Paper, film, and foil coatings
- Letterpress printing materials
- Plastic part coatings

Remaining Categories, Continued

- Metal furniture coatings
- Large appliance coatings
- Auto and light duty truck OEM coatings
- Petroleum drycleaning solvents
- Miscellaneous metal product coatings
- Fiberglass boat manufacturing materials
- Miscellaneous industrial adhesives

Choices under Section 183(e)

- **Regulations**
  - Preferred when users cannot be readily identified
  - Target CCP manufacturers
  - Apply nationwide: attainment and nonattainment areas
  - Provide consistency across the country
- **CTGs**
  - Preferred when users can be identified
  - Target CCP users
  - Apply in nonattainment areas only
  - Must be substantially as effective as regulations
  - Depend on State actions, which may introduce nuances

183(e) Actions to Date

- National Rules
  - Auto refinish coatings
  - Household consumer products
  - Architectural and industrial maintenance coatings
- CTGs
  - Aerospace coatings
  - Wood furniture manufacturing coatings
  - Shipbuilding and repair coatings

VOC Reductions via Toxics Rules

- Section 112 -- National emission standards for hazardous air pollutants (NESHAP)
  - Section 112 required EPA to list industrial source categories for regulation to control 188 listed hazardous air pollutants (HAP)
  - Several 183(e) product categories overlap with source categories listed for HAP regulation under Section 112

183(e) / 112 Overlap

- Shipbuilding surface coating
- Aerospace surface coating
- Wood furniture surface coating
- Flat wood paneling surface coating
- Paper, film, & foil coating
- Plastic parts surface coating
- Metal furniture surface coating
- Auto & light duty truck surface coating
- Miscellaneous metal products surface coating
- Large appliance surface coating
- Fiberglass boat manufacturing

Co-Control of HAP and VOC

- EPA planned to integrate HAP rulemaking with VOC requirements under 183(e)
  - Planned to coordinate VOC reductions with HAP reductions in single regulatory development project
  - Result would be NESHAP with companion CTG

Not a Perfect Solution

- Using add-on controls, co-control of HAP and VOC can be achieved easily
  - Collection and destruction of HAP results in coincidental collection and destruction of VOC
- Using reformulation or substitution, co-control of HAP and VOC is likely, though less certain
  - Most organic HAP are also VOC
  - Some HAP are VOC exempt; some VOC are not HAP
  - Results in much confusion

HAP Work Given Priority

- Complications with integrating HAP and VOC controls led to delays in NESHAP development work
- With increasing pressure to fulfill requirements under 112, resources were shifted away from 183(e) efforts

The Job is Unfinished. . .

- EPA is still accountable for 183(e) work
- Deadline lawsuit will result in court-ordered schedule
- Beginning 6 categories in October 2005
- Expect completion by September 2011

Our Strategy

- Must make category-by-category determinations whether to develop national rules or CTGs
- Most remaining categories appear to be suitable for CTGs, since products are used by identifiable facilities in fixed locations (regulate at facility)
- National rule appears to be most workable approach for aerosol spray paints, since most users are private consumers (regulate at CCP manufacturer)
- Plan to use reactivity-based California Aerosol Coatings Rule as model

Useful Websites

- EPA's work under Section 183(e)
  - www.epa.gov/ttn/atw/183e/gen/183epg.html
- EPA's Air Toxics Website
  - www.epa.gov/ttn/atw

For More Information

Bruce Moore

Emission Standards Division (C504-03)

Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Research Triangle Park, NC 27711

(919) 541-5460

email: *moore.bruce@epa.gov*

Consumer Specialty Products Association

September 30, 2005

Sent *via* e-mail and
First Class Mail

Robert Heil
New Jersey Department of Environmental Protection
Office of Air Quality Management
401 E. State Street, 7th Floor
Trenton, NJ 08625

Subject: White Paper on Future Regulation of Consumer and Commercial Products by the New Jersey Department of Environmental Protection – Tracking # VOC - 003

Dear Mr. Heil:

The Consumer Specialty Products Association (CSPA) appreciates the opportunity to present our suggestions for achieving further reductions of volatile organic compounds (VOCs) in consumer products and commercial products manufactured, sold, or used in New Jersey. As a threshold matter, CSPA is on record as supporting the Department's 2004 revisions to the State's then-exiting consumer products regulation. *See* N.J. Admin. Code Title 7, §§ 7:27-24.1 - 24.7.[1] CPSA supported the revised regulation because it was materially consistent with the Ozone Transport Commission's (OTC's) Model Consumer Products Rule. Thus, New Jersey's existing VOC standards for consumer and commercial products are ***identical*** to currently applicable standards set by the California Air Resources Board (CARB) for more than 80 categories and forms of consumer and commercial products. Consequently, the Department has ***already*** taken decisive action to achieve significant additional creditable emission reductions necessary to meet New Jersey's legally binding State Implementation Plan (SIP) commitments.

The final draft of the VOC workgroup report asserts the conclusion that the Department should "Consider adoption of [California's] 'CONS-2' consumer product standards, when completed." CSPA believes that this option is not viable.

Instead of seeking to promulgate further revisions to New Jersey's comprehensive existing regulation based upon some future California action, CSPA would like to propose a potentially more fruitful and more pragmatic action: the Department should work closely with the United States Environmental Protection Agency (EPA) as the Agency seeks to develop a voluntary programs for providing SIP credit for emission reductions that are occurring from consumers' use of low-VOC compliant products in various states. At a minimum, EPA's proposed program will eliminate the Department's administrative cost and other attendant burdens associated with conducting numerous rounds of rulemakings to revise existing VOC limits for consumer and commercial products. Moreover, this action would preserve the uniformity of the Ozone Transport Region's (OTR's) regulations and thus, avoid needless disruption to vitally important interstate commerce.

[1] New Jersey's current Consumer and Commercial Products Regulation is posted on NJDEP's website at: http://www.state.nj.us/dep/aqm/272495c.htm.

STATEMENT OF INTEREST

CSPA is a voluntary, non-profit national trade association representing approximately 250 companies engaged in the manufacture, formulation, distribution and sale of products for household, institutional, commercial and industrial use. CSPA member companies' wide range of products includes home, lawn and garden pesticides, antimicrobial products, air care products, automotive specialty products, detergents and cleaning products, polishes and floor maintenance products, and various types of aerosol products. CSPA member companies manufacture and market the overwhelming majority of the broad product categories and product forms that are subject to New Jersey's current comprehensive regulation.

Consumer products perform important functions for household and institutional consumers, and often provide significant environmental, public health and safety benefits. For example, household cleaning products, many of which contain antimicrobials, can provide important public health benefits in lowering the transmission of virulent organisms on household and institutional surfaces to people. Household cleaners and polishes also can help extend the life of the durable goods on which they are used, such as floors, furniture, fixtures, carpets, and other fabrics. Household insecticides play a crucial public health role in deterring the spread of insect-borne diseases, and deterring injuries from biting or stinging insects. Many lawn and garden products, such as herbicides, control poison ivy, poison oak and other plants that have deleterious effects on people's health and well-being.

In addition, automotive products can provide significant environmental benefits through helping maintain efficient automotive performance, as well as extending the life of automotive parts. Automotive maintenance products can also provide benefits to the safety of motorists, such as in the maintenance of brakes, or minimizing the time spent in dangerous on-road emergencies (as with tire inflators and sealers). Other automotive products, such as windshield washer fluids, enhance driver safety by improving visibility.

Since the late 1980s, CSPA has worked actively and cooperatively with New Jersey, California, Delaware, Maine, Maryland, Massachusetts, New York, Oregon, Pennsylvania, Texas and Virginia to provide our industry's perspective on these states' consumer products regulations. In addition, CSPA worked cooperatively with the EPA as the Agency developed the National Volatile Organic Compound Emission Standards for Consumer Products.[2] CSPA and The Cosmetic, Toiletry, and Fragrance Association (CTFA) participated as joint intervenors in support of EPA in *Allied Local and Regional Manufacturers Caucus*, *et al v. U.S. Environmental Protection Agency*.[3] Most recently in New Jersey, CSPA presented oral testimony in support of the OTC Model Consumer Products Rule at the New Jersey Clean Air Council Annual Public Hearing on April 11, 2001. We also presented oral testimony at the public hearing on the Department's proposed regulatory action on November 13, 2003. Finally, CSPA filed detailed legal and technical comments on the Department's proposed regulation on November 14, 2003.

---

[2] 40 C.F.R. Part 59 Subpart C (2004). Hereinafter referred to as "EPA National Rule."

[3] 215 F.3d 61 (D.C. Cir. 2000). In this case, CSPA and CTFA filed joint legal briefs supporting EPA's arguments that the Agency had authority to promulgate regulations pursuant to Section 183(e) of the federal Clean Air Act.

DISCUSSION

A. CSPA Supports the Promulgation of Uniform Consumer Products Regulations.

During the past four years, CSPA submitted extensive written comments and presented oral testimony at public hearings in support of ***uniform*** regulations based on the OTC Model Rule in New Jersey and seven other states.[4] In summary, the OTC Model Rule incorporates the most stringent technology-forcing regulatory standards for more than 80 product categories and forms developed by CARB during the past 15 years.[5] New Jersey's recently revised VOC standards may yet pose a significant challenge for some CSPA members since these standards just took effect January 1, 2005. This challenge could be particularly acute for the small- and medium-sized companies that manufacture and market their products on a regional basis. Notwithstanding these legitimate concerns, CSPA has consistently supported the promulgation of uniform regulations based on the OTC Model Rule because it is vitally important that interstate commerce not be impaired by the promulgation of different state regulations in large regions like the Mid-Atlantic and the Northeast.

However, CSPA is very concerned about proposals to further revise the State's existing regulation since this action would undermine the uniformity embraced by New Jersey and other OTR States when these jurisdictions promulgated regulations based on the OTC Model Rule. As a practical matter, even apparently "slight" differences among these states' consumer products regulations could potentially make the new VOC standards unworkable. Moreover, the promulgation of uniform regional regulations is a practical necessity for small businesses since they generally lack the staff resources to ensure that the companies' products comply with a patchwork of different (and potentially conflicting) state-specific requirements. Furthermore, CSPA believes that promulgating additional VOC regulations for consumer and commercial products in New Jersey would be contrary to the Department's previously stated goal of adopting regionally consistent regulation and is at variance with New Jersey's commitment to support uniform regional regulation for consumer and commercial products, as articulated in the OTC's March 28, 2001, Memorandum of Understanding.[6]

B. CSPA Believes that California's Future Effective-date VOC Limits Do Not Present a Viable Option for New Jersey.

As a threshold matter, the Department has already taken very aggressive action to regulate consumer and commercial products. New Jersey's existing VOC standards for consumer and commercial products are ***identical*** to currently applicable standards set by CARB for more than 80 categories and forms of consumer and commercial products.

---

[4] Delaware, Pennsylvania, New York, Maryland, New Jersey, Maine, Virginia and the District of Columbia recently promulgated final consumer products regulations. New Hampshire is expected to promulgate a final regulation within the next several months.

[5] *See* Cal. Code Regs. Title 17, §§ 94507-17.

[6] Memorandum of Understanding Among the States of the Ozone Transport Commission Regarding New Regional Control Measures in the Ozone Transport Region (MOU 01-1). This document is posted on the OTC's website at: http://www.otcair.org/document.asp?Fview=Formal%20Actions#.

CSPA asserts that the workgroup's recommendation that the Department consider adopting California's future effective-date regulatory standards is not viable. Specifically, CSPA believes that it is unrealistic to consider California's recently promulgated CONS-1 regulations as a practical solution in New Jersey for two reasons: (1) CARB's new VOC limits will not take effect until December 31, 2006 (or in two limited cases, there is a later effective date); and (2) aside from the reductions achieved from CARB's prohibition on the sale of certain products containing para-dichlorobenzene after December 31, 2005,[7] the remaining incremental emission reductions achieved by the CONS-1 regulation are spread across a broad range of more than 20 small product categories and subcategories that, in the aggregate, would likely yield minimal additional credible reductions in New Jersey.[8]

Moreover, CARB's ongoing CONS-2 rulemaking is still in the ***initial stages*** of the regulatory process and the agency will not complete the first phase of this two-pronged rulemaking until some time next year. Specifically, CARB has not yet completed its analysis of the comprehensive consumer and commercial products survey that companies submitted earlier this year. As a consequence, CARB has not yet begun the process of considering which product categories will be the subject to new VOC limits that will be developed during this ongoing rulemaking process.

The effective date for the VOC limits that will be established by the two phases of the CONS-2 Rulemaking will not take effect until 2008 (for the first phase) and 2010 (for the second phase). Furthermore, CARB's CONS-2 Rulemaking seeks to achieve additional emission reductions by re-regulating dozens of product categories that have already been regulated, sometimes two or three times since 1990. Since CARB's existing VOC standards were promulgated to achieve the "maximum feasible reduction" as required by California law,[9] CSPA has serious concerns that CARB may be unable to identify technologically and commercially feasible VOC limits to achieve the targeted level of additional reductions. Notwithstanding our realistic concerns, CSPA has committed to continue working cooperatively with CARB as the agency seeks to identify technologically and commercially feasible and necessary additional VOC reductions. These stringent future-effective VOC standards are needed to address the serious and unique challenges confronting California; these challenges are dramatically different than those confronting New Jersey or any other state. Therefore, for reasons stated above, CSPA strongly believes that California's future effective-date VOC limits do not present a viable option for New Jersey as an additional control measures to include in its pending SIP revision.

C. Instead of Making Further Revisions to New Jersey's Existing Comprehensive Regulation, the Department Should Work with EPA in Developing a New Program for Providing States with Additional SIP-creditable Emission Reductions.

Under current law, EPA does not allow emission reduction credits unless a state (*e.g.*, New Jersey) has promulgated an enforceable regulation to impose more stringent VOC limits than those set forth in the National Rule. Thus, unless states continually revise their regulatory requirements, these states cannot claim credit for real and quantifiable emission reductions that

[7] Cal. Code Regs. Title 17, § 94509(o).

[8] Based upon the U.S. Census Bureau's current statistics, New Jersey's population is approximately one-quarter the size of California's population. Consequently, the aggregate proportionate reduction in emissions would likely amount to approximately 1,000 pounds of VOC per day in New Jersey.

[9] Cal. Health & Safety Code § 41712(a)(3).

result from the sale and use low-VOC compliant consumer and commercial products in the state. The Emission Standards Division of EPA's Office of Air Quality Planning and Standards is developing a viable and innovative initiative to solve this problem and to assist states in complying with federal clean air requirements. Currently, EPA is discussing this innovative programmatic concept with the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials and others.

As CSPA understands the ***preliminary*** details of EPA's conceptual program, it is premised upon a realization that a significant percentage of consumer and commercial products that are marketed on nationwide basis comply (or will comply) with more stringent VOC limitations than currently required by EPA's National Rule. Although the concept is still in the early stages of development, some key elements have been identified. Most significantly, EPA is considering the creation of a program that would allow states to claim creditable emission reductions for consumer and commercial products that comply with VOC standards that are: (1) more stringent than currently applicable EPA standards;[10] or (2) more stringent than the VOC limits set forth in the OTC Model Rule (*i.e.*, New Jersey's existing regulatory limits).

In summary, the program currently under consideration by EPA has the potential to be a very pragmatic way for states to claim SIP-credible emissions reductions that result from consumers' use of many products that meet future stringent VOC limits set by CARB. Simply stated, EPA's initiative could eliminate the need for states to initiate independent rulemaking processes to claim credit for reduction in VOC emissions that actually are occurring. Thus, at a minimum, EPA's conceptual program would eliminate states' administrative cost and other attendant burdens associated with conducting numerous rounds of state rulemakings to revise existing VOC limits for consumer and commercial products. Therefore, CSPA strongly urges the Department to work with EPA in developing this new program.

CONCLUSION

As a threshold matter, CSPA believes that that it is vitally important to maintain ***uniform regional regulations*** throughout the Mid-Atlantic and Northeast States. Uniform regulations are particularly important for small businesses since these companies generally lack the staff resources to ensure that their products comply with a patchwork of different (and potentially conflicting) state-specific VOC regulatory limits.

Rather than promulgating further revisions to New Jersey's existing comprehensive regulation, CSPA urges the Department work with the Emission Standards Division of EPA's Office of Air Quality Planning and Standards to assist the Agency in developing a mechanism for providing states with SIP credit for emissions reductions by consumers' use of low-VOC compliant products.

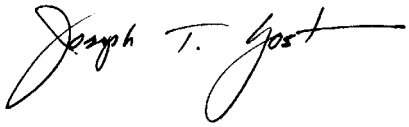
CSPA appreciates the opportunity submit this white paper for inclusion in the Department's final workgroup report. We look forward to working cooperatively with the Department and other

[10] *See* 40 C.F.R. Part 59 Subpart C (2004).

interested stakeholders to identify appropriate and feasible additional regulatory actions needed to meet New Jersey's requirements of the federal Clean Air Act.

Respectfully submitted,

D. Douglas Fratz
Vice President, Scientific
& Technical Affairs



Joseph T. Yost
Director, State Affairs

JTY/ms

cc: Bruce Moore, U.S. Environmental Protection Agency Office of Air Quality Planning and Standards, Emission Standards Division
CSPA Air Quality Special Committee and Product Task Forces
Anthony Russo, Chemistry Council of New Jersey
Andrew R. Hackman, Automotive Specialty Products Alliance
Thomas J. Donegan, Esq., The Cosmetic, Toiletry, and Fragrance Association

October 26, 2005

Sent *via* e-mail and
First Class Mail

Robert Heil
New Jersey Department of Environmental Protection
Office of Air Quality Management
P.O. Box 402
Trenton, New Jersey 08625-0402
airworkgroupvoc@dep.state.nj.us

Subject: Comments on the Draft Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey

Dear Mr. Heil:

The Consumer Specialty Products Association (CSPA) appreciates the opportunity to present our comments on the above-referenced draft report that was issued recently by the Volatile Organic Compounds from Processes and Consumer Products Workgroup (Workgroup). In summary, the Workgroup's draft report identifies potential strategies for reducing emissions of volatile organic compounds (VOCs) from commercial and industrial processes as well as consumer products. The emission reduction strategies presented in the Workgroup's final report will be considered by the New Jersey Department of Environmental Protection (NJDEP) for possible inclusion in the State Implementation Plan (SIP). These revisions to the SIP are necessary for New Jersey to comply the United States Environmental Protection Agency's (EPA's) eight-hour ozone standard and fine particulate matter ($PM_{2.5}$) standard.

CSPA submitted a white paper to NJDEP on September 30, 2005. This document will be included with seven other white papers in Appendix E of the above-referenced report. Our comments today are intended to respond the Workgroup's draft report and to supplement issues addressed in our white paper.

COMMENTS

A. New Jersey Recently Took Decisive Action to Promulgate Strict VOC Limits for Consumer and Commercial Products.

As a threshold matter, the Department has already taken very aggressive action to regulate consumer and commercial products by promulgating significant revisions to the State's consumer products regulation. *See* N.J. Admin. Code Title 7, §§ 7:27-24.1 - 24.7.[1] As a result of this action, New Jersey's current VOC standards for consumer and commercial products are ***identical*** to California's current stringent technology-forcing standards for more than 80 product categories and forms. According to "Table 1: Expected VOC Emission Reductions from Current

[1] New Jersey's current Consumer and Commercial Products Regulation is posted on NJDEP's website at: http://www.state.nj.us/dep/aqm/272495c.htm.

Rules," the State's current consumer products regulation will achieve reductions amounting to 12 tons per day.[2] CSPA is on record supporting NJDEP's stringent regulation because it is consistent with other state regulations in the Mid-Atlantic and Northeast Region.

However, CSPA believes that the Workgroup's draft report erroneously concludes that the 12 tons per day reduction will be achieved in 2007. A more careful review of the regulation reveals that the new VOC standards took effect, and therefore became fully available for SIP credit, on **January 1, 2005**. *See* N.J. Admin. Code Title 7, § 7:27-24.4(a) Table 1. Indeed, most of these additional reductions were made by our industry years in advance of the 2005 effective date of the regulation. Accordingly, CSPA requests that the table be corrected to reflect the proper 2005 effective date.

B. CSPA Reiterates Our Belief that California's "Cons-2" Future-effective VOC Limits Do ***Not*** Present a Viable Option for New Jersey.

CSPA understands NJDEP's need to identify additional emission reduction measures to comply with EPA's new eight-hour ozone standard by June 2010. However, CSPA strongly disagrees with the draft report's conclusion that additional regulation of consumer and commercial products is one of the "most promising" measures for further consideration.[3]

Specifically, CSPA has serious concern that the Workgroup's recommendation that NJDEP consider "…adoption of California's 'Cons-2' consumer products standards, when completed" is not a viable strategy for the Department.[4] CSPA believes that it is unrealistic to consider California's future-effective date regulations for two compelling reasons. First, the California Air Resources Board's (CARB's) ongoing CONS-2 rulemaking is still in the ***initial stages*** of the regulatory process. As correctly noted in the Workgroup's final report, CARB has not yet completed its analysis of the comprehensive consumer and commercial products survey (the first step to developing proposed new VOC limits). As a consequence, CARB has not yet begun the process of considering which product categories may be the subject to new VOC limits that will be developed during this ongoing rulemaking process.

Second, and more significantly, the effective date for the VOC limits that will be established by the two phases of the CONS-2 Rulemaking will not take effect until some time in **2008** (for the first phase) and **2010** (for the second phase).[5] Due to the schedule for these two rulemakings, companies in our industry will not know which of the new standards set by CARB prove to be feasible until very close to these aggressive effective dates.

Finally, as noted in the Workgroup's draft report, CSPA and other representatives of the consumer products industry have expressed serious concerns about CARB's ability to identify technologically and commercially feasible VOC limits to achieve the targeted level of additional

---

[2] Draft final report at p. 3.

[3] *Id.* at p. 8.

[4] *See* Proposal Number VOC-003, *Id* at p. 11.

[5] The draft report erroneously states that VOC limits that will be promulgated in CARB's CONS-2 Rulemaking "will not go into effect until the end of 2006." *Id.* at p. 11. CSPA urges NJDEP to correct this error.

reductions.[6] Consequently, CSPA believes that the CONS-2 rulemaking should not be considered as a viable option unless and until CARB issues final rules and makes a determination that these new VOC limits are technologically and commercially feasible. Such a determination will not be reached until 2009-2010 at the earliest. This timeframe is too late for fair consideration by NJDEP as to whether this strategy should be included in its 2010 SIP revision.

C. CSPA Agrees with the Conclusion that NJDEP Should Work with EPA in Developing a New Program for Providing States with Additional SIP-creditable Emission Reductions.

CSPA fully concurs with the conclusion presented in Proposal Number VOC-003 recommending that the State continue to work with EPA on programs that would grant emission credits for reductions in consumer products VOC emissions without the State being required to adopt further command-and-control regulations.[7] Such a program by EPA could provide additional SIP reduction credits to New Jersey and other states in time for demonstrations of attainment of the new eight-hour ozone standard. For New Jersey, this EPA program could provide credit for reductions beyond those obtained by adoption of the OTC Model Rule, and these levels of reduction credit could increase each year as additional nationwide reductions are made in products by companies in our industry.

D. Reactivity-based Limits for Consumer Products Should Be Considered Only on a Case-by-case Basis.

Proposal Number VOC-002 broadly proposes that consumer products and architectural and industrial maintenance coatings be regulated *via* reactivity-based regulations. CSPA supports the Workgroup's conclusion, as it relates to aerosol coatings, that New Jersey should not go forward with a state rule if EPA proceeds with a national rule to establish a reactivity-based regulation on aerosol coatings that is substantially similar (or identical) to the CARB aerosol coatings rule. We also support the conclusion that reactivity-based regulations for other categories of consumer products should await demonstration that such reductions are technologically and commercially feasible. In general, reactivity-based limits are most effective for emissions that currently have relatively high reactivity. The vast majority of consumer products categories are of very low photochemical reactivity already, and significant further reductions in reactivity are not likely to be feasible. Emissions sources outside consumer products may provide better opportunities for reactivity-based VOC reductions.

Reactivity-based limits, however, are only one of the uses of reactivity recommended by EPA in their recent Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans.[8] EPA also recommends states consider:

---

[6] As explained in CSPA's white paper, CARB's CONS-2 Rulemaking seeks to achieve additional emission reductions by re-regulating dozens of product categories that have already been regulated, sometimes two or three times since 1990. Since CARB's existing VOC standards were promulgated to achieve the "maximum feasible reduction" as required by Section 41712(a)(3) of California's Health & Safety Code, CSPA has serious concerns that CARB may be unable to identify technologically and commercially feasible VOC limits to achieve the targeted level of additional reductions.

[7] Draft final report at p. 11

[8] 70 *Fed. Reg*. 54026-91 (Sept. 13, 2005).

- Developing accurate, speciated VOC emissions inventories;
- Prioritizing control measures using reactivity metrics; and
- Targeting emissions of highly-reactive VOC compounds with specific control measures

The first of these EPA recommendations should be made part of Proposal Number VOC-013, which encourages improvements in the NJDEP emission inventory. The accuracy of the speciation of the VOC inventory, as well as the tonnage, should be reviewed to allow emissions sources to be accurately evaluated regarding their true ozone impacts and the potential for reducing those impacts through reactivity reduction. Accurately speciated emissions inventories would allow control measures to be evaluated on their true ozone reduction benefits, not just their VOC reduction benefits, and assist in targeting the high-reactivity VOC emissions that (in conjunction with local and transported NOx) are actually driving ozone non-attainment.[9] Our assessments comparing the relative reactivity of various VOC emissions sources have shown that many have ozone formation potential three to five times that of consumer products and other such low-reactivity sources.

In the discussion of Proposal Number VOC-002 on reactivity-based controls, the draft report states, "There may also be a transport issue—some formulations are not necessarily less reactive, they are just slower to react (they react further from the point where they emitted."[10] This statement provides a misleading and simplistic view of relative reactivity. While relative reactivity can theoretically be divided into kinetic reactivity (how fast) and mechanistic reactivity (how much), incremental reactivity is evaluated in such a way as to consider appropriately both factors. In the studies funded through the Reactivity Research Working Group, and cited in the recent EPA Interim Guidance,[11] while the impacts of lowering VOC reactivity or mass have complex impacts on ozone formation in specific areas, no instance was found where lowering reactivity resulted in merely moving the geographic location of the ozone formed. In all cases, reducing VOC reactivity reduced ozone in those regions sensitive to VOC emissions (*i.e.*, those areas where VOC mass reductions are effective in reducing ozone).

E. <u>Other Revisions to the Draft Report Also Should Be Made to Enhance Its Accuracy and Completeness</u>.

The draft report occasionally uses the terms "commercial/consumer solvent use" and "consumer products" in a confusing manner. In Figure 2 and Figure 4,[12] the Draft 2002 New Jersey VOC Emission Inventory is cited as showing emissions of 82.93 summer tons per day for "commercial/consumer solvent use." This emissions number is approximated by data cited in the discussion on Proposal Number VOC-003 as 30,186 tons per year for "consumer products (classified as commercial/consumer solvent use)."[13] This appears to indicate potential confusion

---

[9] It is important to note, however, that if appropriate sensitivity runs are included in the ozone attainment demonstrations, it will likely be found that most, if not all, of the OTC region is "NOx-limited" when meeting the eight-hour ozone standard, and VOC emissions are therefore not significantly impacting ozone generation.

[10] Draft final report at p. 14.

[11] *See* 70 *Fed. Reg*. 54026-91.

[12] *See* draft final report at p. 2 and p. 6.

[13] *Id* at p. 10.

between the broad category EPA has defined as "Consumer and Commercial Products" under Section 183(e) of the federal Clean Air Act, of which "consumer products" (as regulated by EPA, California, New Jersey and various other states) represents one small part. (The 1990 EPA inventory of Commercial and Consumer Products showed Consumer Products to represent 597,209 tons/year of the total Consumer and Commercial Products emissions of 3,322,930 tons/year in non-attainment areas.[14] This means that Consumer Products represented about 18 percent of the VOC emissions of all Consumer and Commercial Products at that time.)

We suspect that the emissions estimate of almost 83 tons per day in this report may include some bulk commercial and industrial solvent emissions that are ***not*** considered to be "consumer products." If the 2002 VOC emissions inventory for consumer products in California is transferred to New Jersey on a *per capita* basis, the result is an emissions inventory of approximately 55 tons per day. This significant disparity could be a problem of definition of terms. It can also be noted that using a 2002 inventory as the baseline in this report also serves to overestimate the importance of consumer products VOC emissions, since it does not take into account the further reductions creditable in 2005 due to New Jersey's adoption of the OTC Model Rule. (It is also important to note that actual emissions are even lower, due to the reformulation of products nationwide; these are the further reductions that EPA is seeking to verify and quantify to provide SIP credits for New Jersey and other states.)

Regarding the further regulation of degreasers in Proposal Number VOC-001, it is also important for NJDEP to ensure that this measure does not impact the consumer products regulated by the state. Degreasers that are manufactured and sold as consumer products are subject to specific VOC limits in New Jersey and many other states.

CONCLUSION

CSPA does not believe that California's future effective-date VOC limits present a viable option for New Jersey as an additional control measures to include in its pending SIP revision. CSPA also urges NJDEP to correct the error in Table 1: Expected VOC Emission Reductions from Current Rules to correctly reflect the January 1, 2005, effective date for the stringent technology-forcing VOC limits NJDEP recently promulgated for 80 product categories and forms. Clarifications may also be useful in various statements relating to reactivity and the current emissions inventory. In addition, CSPA presented a number of substantive comments on this draft report that we hope will lead to revisions that enhance the accuracy and reliability of the final report.

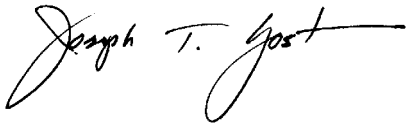
CSPA appreciates the opportunity to participate in the Workgroup's deliberative process and to submit comments on the Workgroup's draft final report. We look forward to continuing our cooperative work with the Department and other interested stakeholders to select and refine

[14] "Study of Volatile Organic Compound Emissions from Consumer and Commercial Products: Report to Congress," U.S. Environmental Protection Agency, EPA-453/R-94-066-A, Table 2-1 (March 1995).

additional feasible regulatory actions that are necessary for New Jersey to meet the applicable requirements of the federal Clean Air Act.

Respectfully submitted,

D. Douglas Fratz
Vice President, Scientific
& Technical Affairs



Joseph T. Yost
Director, State Affairs

JTY/ms

cc: Bruce Moore, U.S. Environmental Protection Agency Office of Air Quality Planning and Standards, Emission Standards Division
CSPA Air Quality Special Committee and Product Task Forces
Anthony Russo, Chemistry Council of New Jersey
Andrew R. Hackman, Automotive Specialty Products Alliance
Thomas J. Donegan, Esq., The Cosmetic, Toiletry, and Fragrance Association

Securing the Industry's Future Since 1894

CTFA
Cosmetic, Toiletry, and Fragrance Association

By email

September 30, 2005

Pamela G. Bailey
President & CEO

Mr. Robert Heil
NJDEP VOC Working Group Leader
New Jersey Department of Environmental Protection
Office of Air Quality Management
401 East State Street, 7th Floor
Trenton, New Jersey 08625

Subj: White Paper on Future Regulation of Consumer and Commercial Products by the New Jersey Department of Environmental Protection – Tracking # VOC-003

Dear Mr. Heil:

The following comment, submitted on behalf of The Cosmetic, Toiletry and Fragrance Association (hereafter "CTFA"), is intended to be an attachment to New Jersey Department of Environmental Protection report to recommend potential ways to control and/or reduce VOC emissions from various products and processes.

CTFA is the national trade association representing the personal care products industry. Our approximately 600 members consist of the manufacturers and distributors of the vast majority of cosmetics, toiletries and fragrances sold in the United States as well as suppliers of goods and services to those manufacturers and distributors. The products manufactured by our member companies include traditional cosmetics such as skin care products, nail and hair care products, and nonprescription drug products such as sunscreens, topical antimicrobial products, antiperspirants and antidandruff shampoos.

Introduction

CTFA is filing this comment in response to the New Jersey Department of Environmental Protection's stated intent to consider adopting regulations governing the volatile organic compound content of consumer products that exceed those currently in place in New Jersey and which exceed the requirements of the Ozone Transport Commission Model Rule.

CTFA has worked with the OTC and many of its member states in the drafting of the Model Rule in the belief that uniform standards in the Northeast and Mid-Atlantic area are essential to maintaining continuous availability of safe and effective personal care products that consumers demand. We believe that the regulations adopted by New Jersey and numerous other states under this plan achieve a goal of obtaining the maximum reductions that are feasible from our products and the entire consumer product category, and urge New Jersey DEP to indefinitely defer plans to adopt more stringent regulations for the following reasons.

1) Further Regulation is Unnecessary or, at a Minimum, Premature

The need to meet standards established by State Implementation Plans approved by the U. S. Environmental Protection Agency for individual states is, of course, one of the major factors driving New Jersey's search for additional emission reductions. While regulations to meet such EPA-approved SIP requirements may eventually be necessary, we believe it is premature for New Jersey DEP to move forward with more stringent standards for consumer products at this time. Far more analysis is necessary to determine whether additional consumer product emission reductions are necessary or feasible to meet current requirements or to meet new SIP requirements based on the 8-hour ozone standard.

EPA's Office of Air Quality Planning and Standards is currently considering a program that will allow states such as New Jersey to take SIP credit for emission reductions resulting from sales of consumer products formulated to comply with the more stringent VOC standards currently in effect in California without adopting its own regulation. Recognizing that adoption and enforcement of such regulations represents a substantial and duplicative expense when required in each state, EPA is considering whether a satisfactory system can be developed for verifying the sales of California-compliant products in other states to justify the allowance of SIP credit in those other states.

We understand this EPA effort is underway with consultations anticipated between EPA's Office of Air Quality Planning and Standards staff and state officials expected in the near future. We strongly urge New Jersey DEP to defer any further efforts to regulate consumer and commercial products until further evaluation of this EPA program indicates whether there is an opportunity to avoid further expense to government and industry that inevitably results from the process of adopting and tracking additional regulations.

For further information on this EPA initiative, we urge you to contact Bruce Moore in EPA's Office of Air Quality Planning and Standards. (Telephone – (919) 541-5460)

2) California Regulations Should Not be Adopted by New Jersey

While it may be tempting to simply adopt California's more stringent VOC limitations on consumer products, we urge New Jersey to carefully consider the risks of taking such action. Even though California is required by statute to ensure that new regulations are technologically and commercially feasible and necessary, a standard we endorse, the California Air Resources Board has adopted the practice of adopting standards that are "technology forcing." In other words, in the cases of some products, the state has adopted standards for future implementation before ascertaining that the technology to formulate products to those standards will be available by the time it is necessary to manufacture compliant products.

Forcing technology has, on occasion, backfired and CARB has been forced to spend even more time and other resources reversing the regulatory requirements to avoid banning certain products or disrupting the supply of such products within the state. This occurred with an unforeseen formulation problem to meet a new standard for aerosol antiperspirants (a nonprescription drug) several years ago. In addition, special steps were required to allow manufacturers to comply with the 55% VOC standard for hairsprays when this was first implemented. Recognizing that it was forcing technology with a 4% VOC standard adopted for shaving gels for implementation in 2009, CARB specifically called for a review of the technology to implement that standard in 2008 to ensure that it will, in fact, be feasible. In short, by adopting California standards, New Jersey will be placing itself in the untenable position of constantly monitoring whether the California standards will be feasible when implemented. To avoid disrupting product supply to New Jersey consumers, New Jersey DEP will need to commit resources where necessary to repeal or adjust future standards. Needless to say, additional burdens and expense will also be imposed on industry to monitor this process and to provide additional information and data.

The final draft of the New Jersey VOC workgroup report proposes adoption of California's "CONS-2" consumer product standards when adopted. We believe this proposal is not advisable and premature. The CONS-2 rulemaking will be shaped by a survey of consumer product formulation and sales in California that is currently under review, and which, by CARB's own analysis, is currently incomplete and contains inaccurate data. Actual rulemaking will not begin until 2006 and will be completed in two phases with regulations expected to become effective in 2008 and 2010. We are highly skeptical that sufficient technologically and commercially feasible emission reductions can be identified to meet goals set in the California SIP. Needless to say, these rulemaking efforts will suffer from the same problems discussed above with respect to technology-forcing standards. We urge New Jersey to abandon a plan to follow in California's footsteps, a course of action that is likely to be resource intensive and inefficient.

We urge the state to maintain its current regulatory requirements for consumer products to ensure consistency with other OTC states. Additional emission reduction credit may in fact be available by working with EPA on its plan to provide additional SIP credit for sale of California-compliant products throughout the United States. Development of such a plan would avoid the additional resource expenditure and possible product disruption that could easily result from the adoption of California "technology-forcing" regulations.

3) <u>New Jersey Regulations Should be Compatible with the OTC Model Rule</u>

The ability to formulate and market a uniform national (or international) product is an essential factor in ensuring that safe and effective personal care products are available to consumers throughout the United States. Because cosmetics are regulated by the U. S. Food and Drug

Administration and must comply with stringent requirements that the safety of their ingredients and final formulations be properly substantiated, reformulation to meet air quality standards can be an expensive and time-consuming process. FDA requirements for nonprescription drugs are even further limiting to ensure that products are both safe and effective. These reformulation difficulties are further exacerbated if different requirements are imposed by individual states. Even very small differences between standards in different states can cause great expense and possible disruption of the supply of important products to consumers.

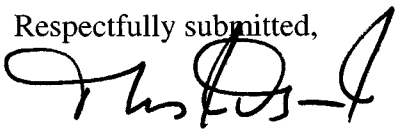
CTFA and other industry groups have supported the development of the OTC Model Rule and the efforts of individual states, including New Jersey, to adopt that rule because the standards were technologically and commercially feasible and because a commitment to the Model Rule was intended to ensure that the Northeast and Mid-Atlantic Region would have uniform standards that would allow the same products to be distributed throughout this region. We strongly urge New Jersey DEP not to pursue a course of action that would undermine the continued viability of the OTCs efforts to maintain this uniformity. At a very minimum, we urge New Jersey to defer any further action until it can be determined whether additional SIP credit can be obtained for products where VOCs have been reduced beyond New Jersey requirements without the need for further regulation.

Conclusion

We urge New Jersey to defer any further action to adopt VOC limits for consumer products that differ from those in its current law, and to focus its efforts on working with EPA on a viable system to obtain SIP credit for the California-compliant products that are already being sold in the state. CTFA will support this effort, and has advised EPA of our industry's willingness to work with them on this project.

Please feel free to contact me or Carrie Hay-Gregory at CTFA if you have questions or need further information.

Respectfully submitted,



Thomas J. Donegan
Vice President – Legal & General Counsel

Securing the Industry's Future Since 1894

By email

October 26, 2005

Pamela G Bailey
President & CEO

Mr Robert Heil
NJDEP VOC Working Group Leader
New Jersey Department of Environmental Protection
Office of Air Quality Management
401 East State Street, 7th Floor
Trenton, New Jersey 08625

Re Draft "Collaborative Report Presenting Air Quality Strategies For Further Consideration by the State of New Jersey"

Dear Mr Heil

This comment is submitted on behalf of The Cosmetic, Toiletry, and Fragrance Association (CTFA)[1] in response to the draft Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey received by CTFA on October 24 These written comments supplement CTFA's white paper submitted to the agency on September 30, 2005

California's CONS-2 Regulations are not an Appropriate Model for New Jersey

We are extremely disappointed to learn that the Consumer Products Workgroup is recommending additional control of consumer products by means of the California Air Resources Board's "CONS-2" regulation, an approach that CTFA and others who have commented and participated in this process believe is a flawed model that is still evolving in California and certainly not ready to be used as a model by other states

We are particularly disappointed that this action which could seriously harm the personal care products industry is taking place in New Jersey, a place that many of those employed in our industry call home CTFA represents companies with over 260 New Jersey based facilities employing approximately 44,000 workers in the state These New Jersey based facilities include manufacturing plants, research and development centers, distribution and packaging centers, warehouse and administrative offices The majority of these facilities are manufacturing and research and development facilities where the products of this rule are formulated

[1] CTFA is the national trade association representing the personal care products industry Our approximate 600 members consist of the manufacturers and distributors of the vast majority of cosmetics, toiletries, and fragrances sold in the United States as well as suppliers of goods and services to those manufacturers and distributors The products manufactured by our member companies include traditional cosmetics such as skin care products, nail and hair care products, and nonprescription drug products such as sunscreens, topical antimicrobial products, antiperspirants and antidandruff shampoos

The CARB staff is still in the process of analyzing a consumer product survey that it believes will form the basis for its "CONS-2" rulemaking – it has not yet published its findings from this survey, nor has the CARB staff given any indication of the product categories it believes to be appropriate targets for regulation We currently do not expect that information to be available until December or possibly early 2006 The first phase of this rulemaking is not scheduled to be adopted by the CARB Board until the end of 2006, the second phase is scheduled to be adopted by the end of 2008

In short, CONS-2 is not ready for "prime time" in California, let alone New Jersey With California's history of proposing, and sometimes adopting, "technology forcing" regulations that do not always turn out to be feasible to implement, we are very concerned that New Jersey is willing to buy in to this process sight unseen It is entirely possible that there will be strong disagreement with California proposals, and a lengthy process to discussion with the Air Resources Board before it can be determined which, if any, future proposals are technologically and commercially feasible Even if additional consumer product regulations turn out to be necessary in New Jersey, the CONS-2 regulations cannot be looked to as a precedent until the California process is completed

The fact that the California process is tenuous as a precedent is illustrated by one of the standards already adopted by the CARB Board as part of its CONS-1 regulation A future standard for shaving gels of 4% VOC to take effect December 31, 2009 was adopted by the Board last year, but only with the caveat that there would be a technology review in 2008 to ensure that the standard was technologically and commercially feasible as required by law

If the shaving gel standard is deemed not feasible in 2008, it could be eliminated, changed or the deadline for compliance could be further delayed in California What would New Jersey do in such a situation? Is New Jersey willing to commit the resources to conduct similar technology reviews? Is New Jersey willing to move in a timely manner to change its regulations as California changes? If the answer to these questions is no, then New Jersey is going down a path that will disrupt – not foster – uniformity and the free flow of consumer products across state lines

Because California is pushing into uncharted territory to achieve significant emission reductions with CONS-2 after years of regulating consumer products – some categories have been reformulated two or three times – we believe most or all of the future standards that come out of CONS-2 will be tenuous at best and will require constant reevaluation and adjustment to avoid standards that effectively ban products, a result that is prohibited by California law

EPA Efforts to Allow SIP Credit for Voluntary Reformulation by Manufacturers is the Most Promising Way to Achieve Consumer Product Emission Reduction Goals

New Jersey should defer any additional action until EPA determines whether voluntary VOC reductions, whether in response to regulations of other states or voluntarily adopted by individual manufacturers, can be credited under a SIP As we indicated in our original comments, EPA Office of Air Quality Planning and Standards is currently considering a program that will allow states such as New Jersey to take SIP credits for emission reductions resulting from sales of consumer products formulated to comply with the more stringent VOC standards currently in effect in California *without adoption of its own regulation* We urge New Jersey to give this process its highest priority before moving precipitously to embrace future California regulations that may or may not prove feasible

Regulations for Consumer Products Based on Reactivity Must Be Investigated on a Product by Product Basis

Although California has adopted reactivity-based regulations for aerosol coatings with apparent success, the application of reactivity-based standards to consumer products has been a highly controversial and contentious subject Because of the wide variety of purposes served by personal care products, and the need to meet stringent regulatory requirements for efficacy and safety, we urge New Jersey to take a very cautious approach to reactivity as a solution for consumer product emissions Once again, the narrowly-focused California aerosol coatings reactivity regulations should not be deemed an "off-the-shelf" solution to regulating a complex mix of consumer products

If New Jersey wishes to pursue a reactivity-based approach, it must be committed to a very thorough analysis of the role that VOCs play in each product category and whether that product can remain safe and effective simply with the substitution of ingredients with lower reactivity This will be a time-consuming process which must involve persons with expertise not only in atmospheric chemistry but also the formulation technology for each specific product category considered

The Efforts of the Ozone Transport Commission to Encourage Uniformity Should Not be Undermined

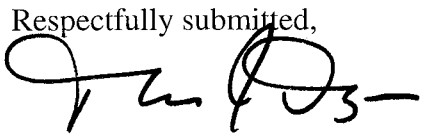
Finally, we also must express disappointment that the Workgroup is still intent on departing from the framework of the OTC Model Rule, a step that threatens to make New Jersey an island where products that meet standards in other Northeast and Mid-Atlantic states will not be available to consumers This action also reduces incentives for other states to continue to follow uniform standards for the region, threatening the entire system

We urge New Jersey to temper its approach to consumer products, placing a strong focus on working with U S EPA on a solution that will provide SIP credit for voluntary emission reductions while working with its colleagues in other OTC states as the actual requirements of the eight-hour ozone standard become clearer to find an approach that will allow continued uniformity and a continued free flow of important consumer products across state lines

Conclusion

We appreciate the opportunity to comment on the draft report and hope that there will be continued opportunity for discussion with NJDEP on these issues as you go forward with your recommendations If you have any questions or need additional information, please feel free to contact us

Respectfully submitted,



Thomas J Donegan
Vice President – Legal & General Counsel

September 30, 2005

New Jersey Clean Air Act Advisory Committee
Volatile Organic Compounds from Processes and Consumer Products Workgroup

Dear Sirs:

I am writing on behalf of the National Paint and Coatings Association (NPCA) to share some our thoughts on the recent workgroup's proposal to consider adoption of California's aerosol coating reactivity based emission standard and to "consider moving toward reactivity based emission standards for consumer and AIM products as their technical feasibility is demonstrated."

These comments are confined to the consideration of reactivity based standards for AIM coatings.

For NPCA's views on adoption of the California aerosol coatings reactivity-based standards and the possible use of reactivity based standards for consumer products, please see the comments filed by Heidi McAuliffe, NPCA Government Affairs Counsel.

By way of background, NPCA is a voluntary, nonprofit trade association representing some 400 manufacturers of paints, coatings, adhesives, sealants, and caulks, raw materials suppliers to the industry, and product distributors. As the preeminent organization representing the coatings industry in the United States, NPCA's primary role is to serve as ally and advocate on legislative, regulatory and judicial issues at the federal, state, and local levels.

NPCA and its member companies have been extensively involved in New Jersey's clean air regulatory efforts affecting our products, including most recently its adoption of the OTC model rule for AIM coatings.

A representative from one of our member companies, Dan Forestiere of The Sherwin-Williams Company, is a member of the workgroup and has co-authored these comments.

We concur in the proposal to consider the possible use of reactivity based emissions standards for AIM coatings and look forward to further discussions on the matter.

At this early stage, we believe the workgroup is correct in prudently recommending only to "consider" as opposed "to enact" such standards for AIM coatings. Presently, there is not enough information to determine the feasibility or utility of such standards for AIM coatings.

The utility of a reactivity standard will depend on the nature of the coatings involved. In this connection, we note that while the California Air Resources Board adopted a reactivity based emission standard for aerosol coatings, after conducting an extensive survey of automotive refinish coatings, it declined to do so for these coatings apparently because of the inherent difficulties of specifying reactivity standards for such chemically diverse and numerous materials.

The proposal rightly notes that any consideration of moving to reactivity-based standards must take into account the potential economic impacts of the decision. Obviously this should include whether the costs of reformulating an already very low VOC coating to meet a reactivity-based standard is warranted in light of the inconsequential ozone reduction.

Not mentioned in the proposal is the potential benefit in using relative reactivity to help determine the degree to which a group of products may be contributing to ozone formation. This approach is independent of whether it makes sense to regulate all of these products with a reactivity-based standard.
NPCA has long advocated realistic, scientifically-based standards for both regulating our products and for determining the degree to which our products contribute to ozone formation. At the heart of making realistic determinations about ozone formation is the degree to which various materials contribute to it through their relative reactivity. In some cases it may make sense to also base the actual VOC product standards on reactivity; in others, it may not.

A related issue is the recent US EPA advance note of proposed rulemaking (ANPR) to consider comment on technically sound methodology for estimating the VOC emission reductions that are associated with VOC emission standards for architectural and industrial maintenance (AIM) coatings. (See 70 Fed. Reg. 51694 (August 31, 2005)). The scope of the ANPR includes identification of the correct baseline for pre-regulatory emissions. We will comment on this ANPR and will share our comments with the workgroup. In this connection, we note that Dan Forestiere has raised concerns during workgroup sessions about the accuracy of 2002 emissions inventory values and their use in determination of current AIM coatings VOC emissions in New Jersey.

Sincerely,

Jim Sell, NPCA Senior Counsel

Dave Darling, NPCA Director, Environmental Affairs

From: "John Maxwell (New Jersey)" <Maxwellj@api.org>

To: <airworkgroupvoc@dep.state.nj.us>

Date: Fri, Sep 30, 2005 3:46 PM

Subject: VOC Workgroup ORVR Membrane Comments

<<FL Report - final.pdf>>

VOC Comments from the New Jersey Petroleum Council

September 30, 2005

Re: Volatile Organic Compounds from Processes and Consumer Products Workgroup: VOC-005 - New membrane technology to control VOCs from gasoline retail tanks.

Via e-mail to: Bob Heil, NJDEP (973) 656-4088. airworkgroupvoc@dep.state.nj.us

The New Jersey Petroleum Council (NJPC) is aware of the efforts of a workgroup made up of interested parties to develop recommendations of potential ways to control and/or reduce VOC emissions from various chemical products and/or processes. The NJPC further understands that the topics considered by this workgroup included consumer products as well as industrial processes. Among the control measures being considered are additional vapor controls on gasoline dispensing facilities or, more specifically, retail gasoline outlets.

The NJPC has concerns regarding the listing of what is a relatively new vapor processing technology using semi-permeable membranes to control VOCs from retail gasoline vent lines (VOC-005).

1. There is one membrane vapor processor currently certified by CARB for purposes of making one existing vac-assist vapor recovery system compatible with vehicle-based on-board refueling vapor recovery (ORVR) systems. There is at least one other membrane technology that may eventually compete with this single certified system once it also gains certification. These processors were both developed to handle the small amounts of emissions that may result from refueling ORVR vehicles at vac-assist gasoline dispensing facilities. The alleged ORVR incompatibility is most often attributed to the interaction of some vacuum assist systems and ORVR equipped vehicles. API has done work that shows that much of the incompatibility can be eliminated by making simple adjustments to these systems.

2. ORVR is a competing vapor recovery technology at retail gasoline outlets. The

USEPA is in the process of defining ORVR "widespread use" for purposes of eventually phasing out redundant Stage II vapor recovery programs. API supports the USEPA's efforts and is advocating that the existing ORVR program, when it is determined to be in "widespread use", will allow the phase out of Stage II vapor control systems in individual nonattainment areas. API's analysis shows that widespread use, depending on the definition and the particular nonattainment area, is likely to fall between 2009 and 2012.

3. The membrane vapor processor technology is fairly fresh out of the box from CARB certification (November 2004). The device does not have much real world use; thus, at this point in time it is difficult to physically place the device in many existing facilities and because of the lack of experience with the equipment it is difficult to determine how it will perform in the field. The membrane vapor processor system has been just recently certified by CARB (November 2004) and, consequently, there is not much real-world experience regarding its effectiveness and durability. It is also worth noting that because of certain fire code requirements and lot size limitations, some facilities will have difficulty locating the processor on their site.

4. NH & MD have been eying the membrane vapor processor as a possible solution to perceived subsurface gasoline vapor situations. This is a relatively new matter that is currently under discussion in several circles. API and the USEPA are working to quantify and better understand these small releases as they pertain to potential groundwater contamination.

5. The stated initial capital expense for membrane vapor processor system is between $30,000 and $50,000. This is a significant investment for any retail gasoline outlet. In California, some major oil companies with vac-assist vapor recovery systems have found it more cost effective to convert those systems to balance in lieu of installing membranes or other add-on devices to become ORVR compatible. Additionally, the table states that "[T]he expense may be too costly for privately owned stations." This statement recognizes that a mandate for this technology could well result in an unlevel playing field.

Tech Environmental recently completed a cost analysis of ORVR-compatible systems for three counties in Florida. One of their conclusions was that for a capital cost of $20,000, the control cost increased above $10,000 per ton of VOC reduced by 2009 (see attached report).

API members support more diligent enforcement of the existing Stage I and II vapor recovery programs, particularly those efforts aimed at improved inspections and maintenance. Such a program is the most effective and economical way to reduce VOCs from gasoline dispensing facilities.

We hope that these comments are helpful. We are in support of cleaner air and are doing our part by bringing cleaner fuels to the marketplace. We are skeptical, however, concerning the promise of new technologies that have not been thoroughly vetted. Please do not hesitate to call if you have any questions or would like to discuss this further.

Sincerely,

John A. Maxwell

New Jersey Petroleum Council

maxwellj@api.org

609-392-0800

CC: "Prentiss Searles" <Searlesp@api.org>, "Jim Benton (New Jersey)" <Bentonj@api.org>, "Eric DeGesero" <edegesero@fmanj.org>

REFUELING EMISSION CONTROLS AT RETAIL GASOLINE DISPENSING STATIONS AND COST-BENEFIT ANALYSIS OF STAGE II IN FLORIDA

Submitted to:

American Petroleum Institute
1220 L Street NW
Washington, D.C. 20005

Prepared by:

Tech Environmental, Inc.
1601 Trapelo Road
Waltham, MA 02451
(781) 890-2220

July 2005

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1-1

2.0 INTRODUCTION 2-1
2.1 Regulatory Requirements for Vehicle Refueling Emission Controls 2-1
2.2 Stage II Equipment – Existing Types and Functionality 2-3
2.3 Description of ORVR Systems 2-3
2.4 Vacuum Assist Stage II-ORVR "Excess Emissions" 2-4

3.0 METHODOLOGIES FOR EMISSIONS CALCULATIONS 3-1
3.1 MOBILE Emission Factors 3-1
3.1.1 Uncontrolled Vapor Displacement Emission Factors 3-1
3.1.2 Stage II and ORVR Control of Vapor Displacement Emissions 3-2
3.1.3 Emission Factors for Spillage 3-4
3.1.4 Combining Data for Individual Vehicle Types and Models 3-4
3.1.5 Validation of Tech Environmental's Model Against MOBILE6 3-5
3.2 "Excess Emissions" from Vacuum Assist Stage II-ORVR 3-5
3.2.1 CARB Test Data and Estimates of "Excess Emissions" 3-6
3.2.2 Tech Environmental Calculations of CARB's "Excess Emissions" 3-8
3.2.3 API-Sponsored Study of "Excess Emissions" 3-9
3.3 Gasoline Throughputs 3-9
3.4 Summary of Calculation Methodology 3-10

4.0 REFUELING EMISSIONS CALCULATIONS FOR FLORIDA 4-1
4.1 Input Data to Calculation Methodology 4-1
4.1.1 Vehicle Miles Traveled (VMT) 4-1
4.1.2 Vehicle Registration Data/Age Distributions 4-2
4.1.3 Gasoline Usage 4-2
4.1.4 Stage II In-Use Efficiency 4-2
4.2 Results of Refueling Emissions Calculations 4-2
4.3 Conclusions 4-4

5.0 STAGE II COST BENEFIT ANALYSES FOR FLORIDA 5-1
5.1 VOC Emission Calculations 5-1
5.2 Stage II Maintenance / Vapor Processor Retrofit Costs 5-1
5.3 Results of Cost Benefit Analysis 5-3

1.0 EXECUTIVE SUMMARY

In several areas of the state there are duplicative requirements for controlling air emissions from vehicle refueling. Gasoline dispensing facilities (GDFs) in areas classified as "nonattainment" with respect to the National Ambient Air Quality Standard (NAAQS) for ozone are equipped with "Stage II" vapor recovery systems (VRS) for capturing vapors displaced during refueling and returning them to the GDFs' underground storage tanks. At the same time, new vehicles in the United States are being equipped with onboard refueling vapor recovery (ORVR) systems for adsorbing these same vapors within the vehicles (the vapors are later desorbed during vehicle operation and destroyed in the engine). Recognizing the redundancy of these technologies, the Clean Air Act allows the Environmental Protection Agency (EPA) Administrator to remove the Federal requirement for Stage II VRS once ORVR systems are "in widespread use."

The California Air Resources Board (CARB) claims that there is an incompatibility that exists between many vacuum-assisted Stage II VRS and ORVR systems that results in "excess emissions" of pressure-related fugitives—i.e., refueling emissions that are higher than those that would exist if only one of the systems were being used.[1] CARB estimated that by the year 2010 (when total gasoline sales in California are predicted to be 43.4 million gallons/day), total excess emissions in their state would be 6.32 tons per summer day. The Florida Department of Environmental Protection (FDEP) has not quantified the extent of these "excess emissions" in the three counties where Stage II VRS are installed. Stage II VRS are installed in the tri-county Southeast Florida Airshed, which includes Palm Beach, Broward, and Dade counties. These areas were originally designated as moderate nonattainment for ozone, but were redesignated to maintenance as of April 25, 1995.

The "excess emissions" are measured in units of pounds per 1000 gallons of gasoline dispensed (lb/1000 gal). The following table identifies currently available data on measured excess emissions. These data can be used to determine the excess emissions given certain assumptions about the equipment. To date, CARB claims that one configuration of the Marconi/Gilbarco VaporVac Stage II VRS equipment is responsible for the majority of excess emissions. A summary of all existing excess emission rates for the Marconi/Gilbarco VRS is as follows:

Data collected by	Nozzle Type	Air-to-Liquid (A/L) Ratio	Excess Emissions (lb/1000 gallons)
CARB	Standard (no boot)	1.1	0.86
CARB	Mini-booted	1.1	0.43 (estimated)
API	Standard (no boot)	1.15	0.72
API	Standard (no boot)	1.15	0.42 *
API	Mini-booted	0.95	0

* Rate is for total incompatibility emissions (see definitions in footnote 1)

[1] Excess emissions of pressure-related fugitives, referred to as "excess emissions" in this report, are the difference between pressure-related fugitives for an ORVR vehicle versus a non-ORVR vehicle when refueled with a Stage II VRS. Pressure-related fugitives are hydrocarbon emissions from a GDF due to positive pressure gauge in the headspace of the underground storage tank; these occur as leaks in the piping system. Total incompatibility emissions are the difference between all refueling emissions (pressure-related fugitives, P/V valve and fillpipe emissions) for an ORVR vehicle versus a non-ORVR vehicle.

Tech Environmental developed a spreadsheet that incorporates both EPA's MOBILE6 methodologies and calculations of "excess emissions" to study refueling emissions in Palm Beach, Broward, and Dade counties. This report quantifies excess emissions from "ORVR incompatibility" (as defined by CARB and API) and establishes the timelines by which ORVR would be "in widespread use."

Tech Environmental also performed cost-benefit analyses for 1) maintaining Stage II at GDFs, and 2) adding vapor processor retrofits to existing Stage II GDFs, to determine whether it is cost-effective to retain Stage II in the three Southeast Florida counties as ORVR-equipped vehicles become common.

The overall conclusions of this study are:

- The purported "incompatibility" of ORVR and vacuum-assisted Stage II equipment does not produce significant emissions increases.

- ORVR should be considered to be "in widespread use" within the 2007-2017 timeframe, depending upon how this term is defined and what county is examined. Thus, in the near future FDEP can petition EPA to remove Stage II requirements in the tri-county area without compromising air quality.

- As times goes on and more vehicles are ORVR-equipped, the benefits of maintaining Stage II decrease and the costs of doing so rise rapidly to a level that is not cost-effective.

These conclusions are based on this report, which shows the following:

1. CARB based its estimates of excess emissions from "ORVR incompatibility" upon a 1999 preliminary draft test report, which acknowledges that the test methodologies used may have biased results high. CARB did not account for the fact that gasoline volatilities were higher at the time of the testing than they are today. Furthermore, for one of the two GDFs tested, CARB used the data set taken when the required pressure/vacuum (P/V) valve on the GDF's storage tank was removed, instead of using the data when the valve was in place. Correcting only for volatility and using the data set where the P/V valve was in place results in a 34% reduction in "excess emissions." Methodology biases cannot be quantified.

2. In 2007, "excess emissions" (calculated using CARB's data, corrected as described above) will only be 0.17 tons/summer day (tpsd) in Palm Beach county, 0.21 tpsd in Broward county, and 0.29 tpsd in Dade county. FDEP has estimated that total emissions of volatile organic compounds (VOC) from all sources in these regions are 549 tons/day (tpd), 175 tpd, and 420 tpd, respectively.

3. Using data obtained from a refueling study commissioned by the American Petroleum Institute (API), the "excess emissions" in 2007 will only be 0.15 tons/summer day (tpsd)

in Palm Beach county, 0.19 tpsd in Broward county, and 0.26 tpsd in Dade county. (This assumes Marconi/Gilbarco VRS are equipped with standard nozzles and A/L = 1.15.)

4. If total incompatibility emissions (including fillpipe emission reductions from ORVR) from the API study are assumed, then in 2007 the "excess emissions" will only be 0.12 tons/summer day (tpsd) in Palm Beach county, 0.14 tpsd in Broward county, and 0.20 tpsd in Dade county. (This assumes Marconi/Gilbarco VRS are equipped with standard nozzles and A/L = 1.15.)

5. CARB estimated that 50% of excess emissions can be eliminated by installing a simple "mini-boot" modification offered by the vendor. API refueling test results show that "excess emissions" from the Marconi/Gilbarco VaporVac Stage II VRS are totally eliminated with a "mini-boot" (100% reduction). Assuming elimination of all excess emissions from Marconi/Gilbarco VRS (actual measured performance with a mini-boot), there would still be some small "excess emissions" from Wayne Vac VRS. Thus, in 2007, "excess emissions" would only be 0.07 tons/summer day (tpsd) in Palm Beach county, 0.08 tpsd in Broward county, and 0.11 tpsd in Dade county. (This assumes Marconi/Gilbarco VRS are equipped with a mini-boot and A/L = 0.95).

6. EPA is considering four different means of identifying "widespread use" of ORVR:

   i. "When "x" percent of the vehicles in service are ORVR-equipped";
   ii. "When "x" percent of the vehicle miles traveled (VMT) are from ORVR-equipped vehicles";
   iii. "When the total VOC emissions from refueling vehicles (without Stage II) are equal to the total VOC emissions from refueling vehicles with Stage II but without ORVR"; or
   iv. "When "x" percent of the gasoline sold is dispensed to ORVR-equipped vehicles.

Figures 1-1 through 1-3 reveal that the ORVR-only emissions will be equivalent to the Stage II-only emissions by 2007, 2008, and 2009 in Palm Beach, Broward and Dade counties, respectively (see Point A). These figures also show the refueling emissions calculations from the Florida SIP[2]. The Florida SIP is predicting Stage II emissions in 2015 will be 0.97 tons per summer day (tpsd) in Palm Beach county, 1.57 tpsd in Broward county, and 1.93 tpsd in Dade county. This report is predicting that refueling emissions from ORVR alone would be below these values by 2012, 2011, and 2014 in Palm Beach county, Broward county, and Dade county, respectively. With ORVR and Stage II, including "excess emissions", this report is predicting that refueling emissions would be below these SIP values by 2006, 2004, and 2007 in Palm Beach county, Broward county, and Dade county, respectively.

Figure 1-4 shows that 70% of the gasoline dispensed by GDFs will be dispensed to ORVR-equipped vehicles by 2008 in Palm Beach county, by 2009 in Broward county, and by 2010 in Dade county; 80% will be dispensed to ORVR-equipped vehicles by 2010 in Palm Beach county, by 2011 in Broward county, and by 2013 in Dade county; and 90% will be dispensed by 2014 in Palm Beach county, by 2016 in Broward county, and by 2017 in Dade county.

[2] Tom Rogers (FDEP), electronic mail to Dana Buske (Tech Environmental), June 7, 2005.

Figure 1-5 illustrates that 70% of the VMT will be by ORVR-equipped vehicles by 2008 in Palm Beach county, by 2008 in Broward county, and by 2009 in Dade county; 80% will be by ORVR-equipped vehicles by 2010 in Palm Beach county, by 2010 in Broward county, and by 2012 in Dade county; and 90% will be by ORVR-equipped vehicles by 2013 in Palm Beach county, by 2014 in Broward county, and by 2016 in Dade county.

7. The cost-benefit analysis demonstrates that actual VOC reductions in Palm Beach, Broward and Dade counties from Stage II systems would be 4.12 tpsd in 2007, shrinking to only 0.44 tpsd by 2015, see Figure 1-6. The total cost of maintaining Stage II is $4,900/ton in 2007, rising steeply to $45,500/ton in 2015 (all numbers are in 2005 dollars). If vapor processor retrofits to eliminate any "incompatibility emissions" are assumed, than the implementation cost is $7,800/ton in 2007, rising rapidly to $25,300/ton in 2015, see Figure 1-7. In either case, the benefits of maintaining Stage II decrease in the near future as the costs rise steeply and keeping Stage II systems in place ceases to be a cost-effective VOC control strategy.

FIGURE 1-1. REFUELING EMISSIONS IN PALM BEACH COUNTY, 2001-2030.

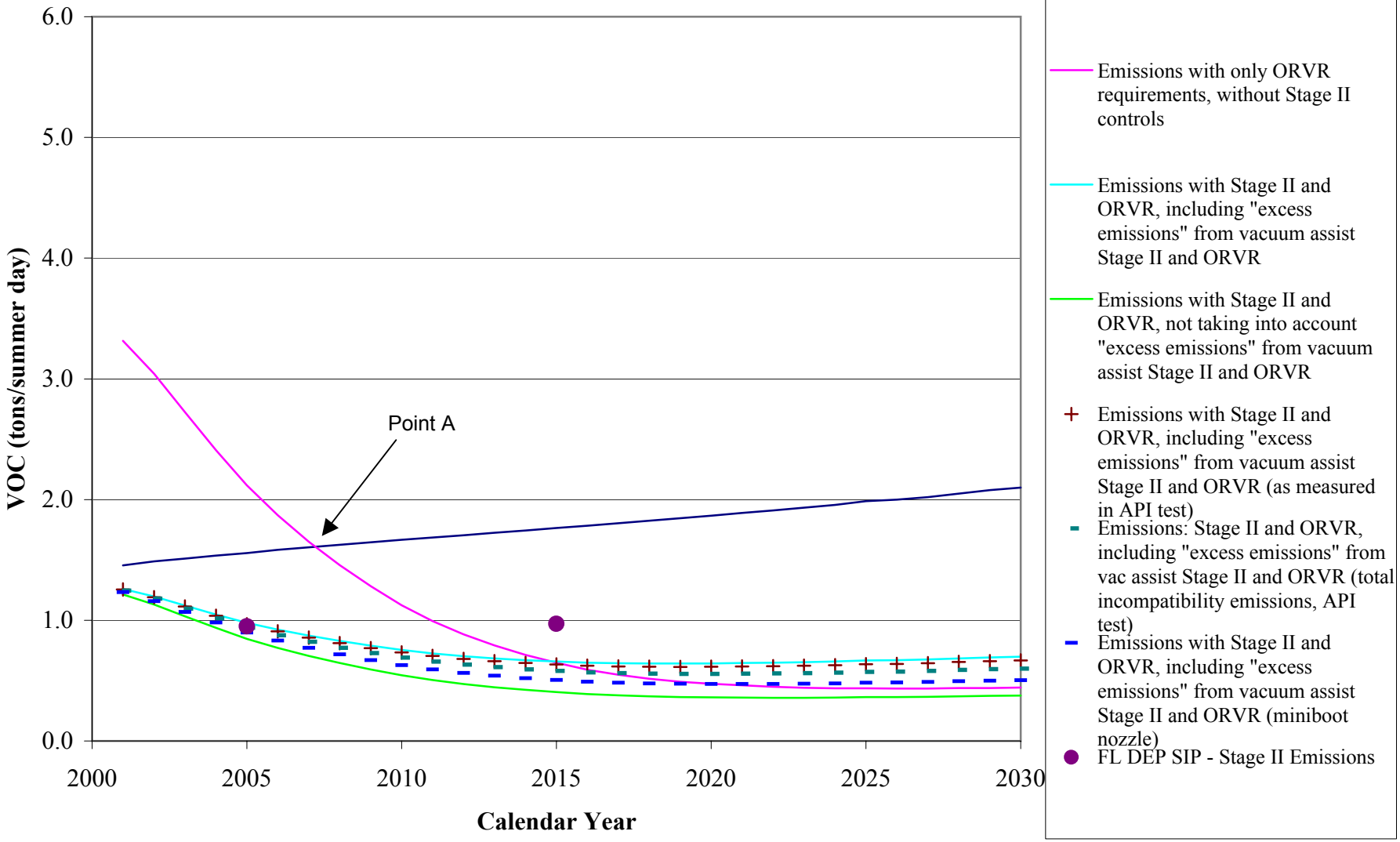


FIGURE 1-2. REFUELING EMISSIONS IN BROWARD COUNTY, 2001-2030.

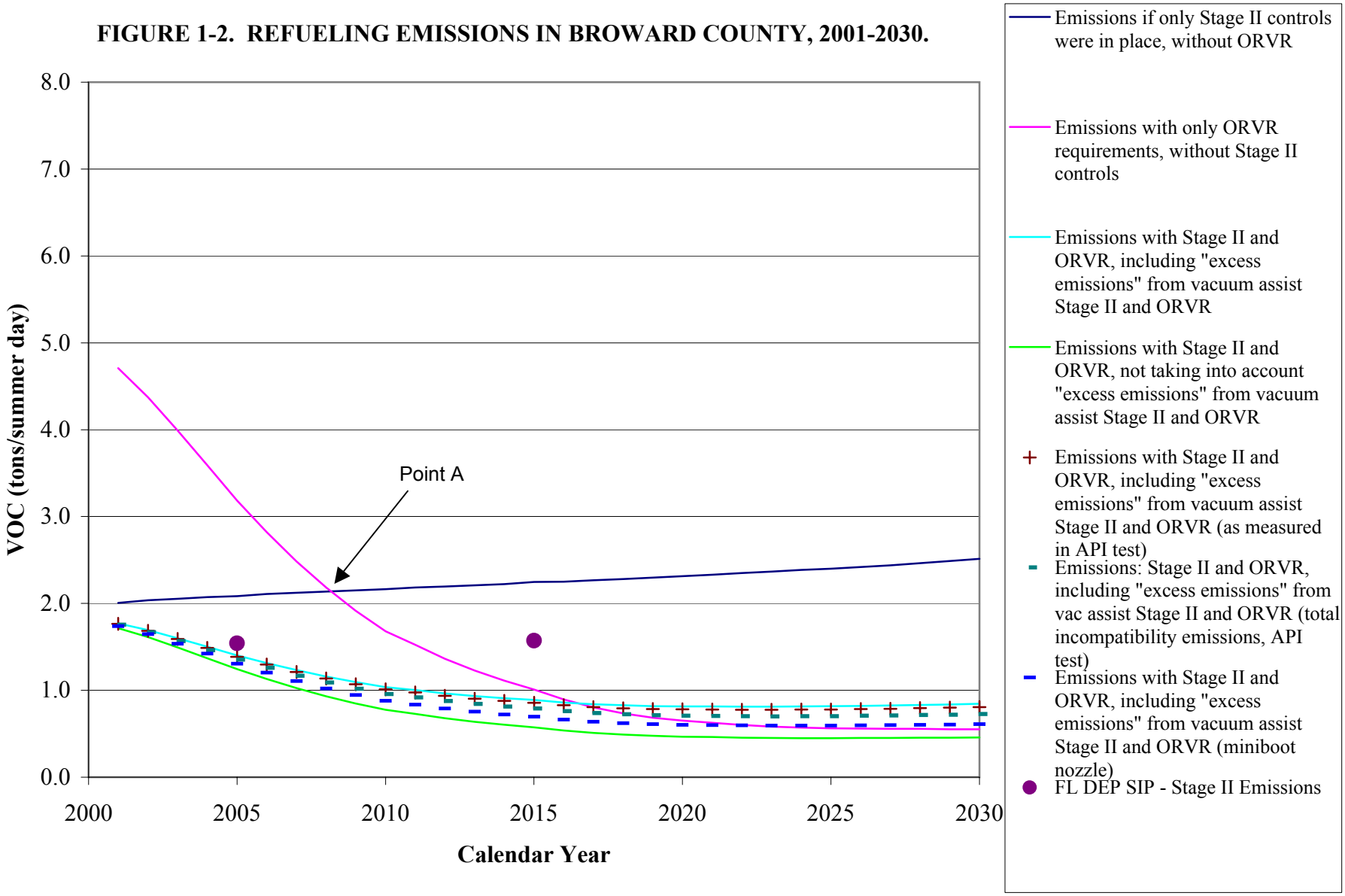


FIGURE 1-3. REFUELING EMISSIONS IN DADE COUNTY, 2001-2030.

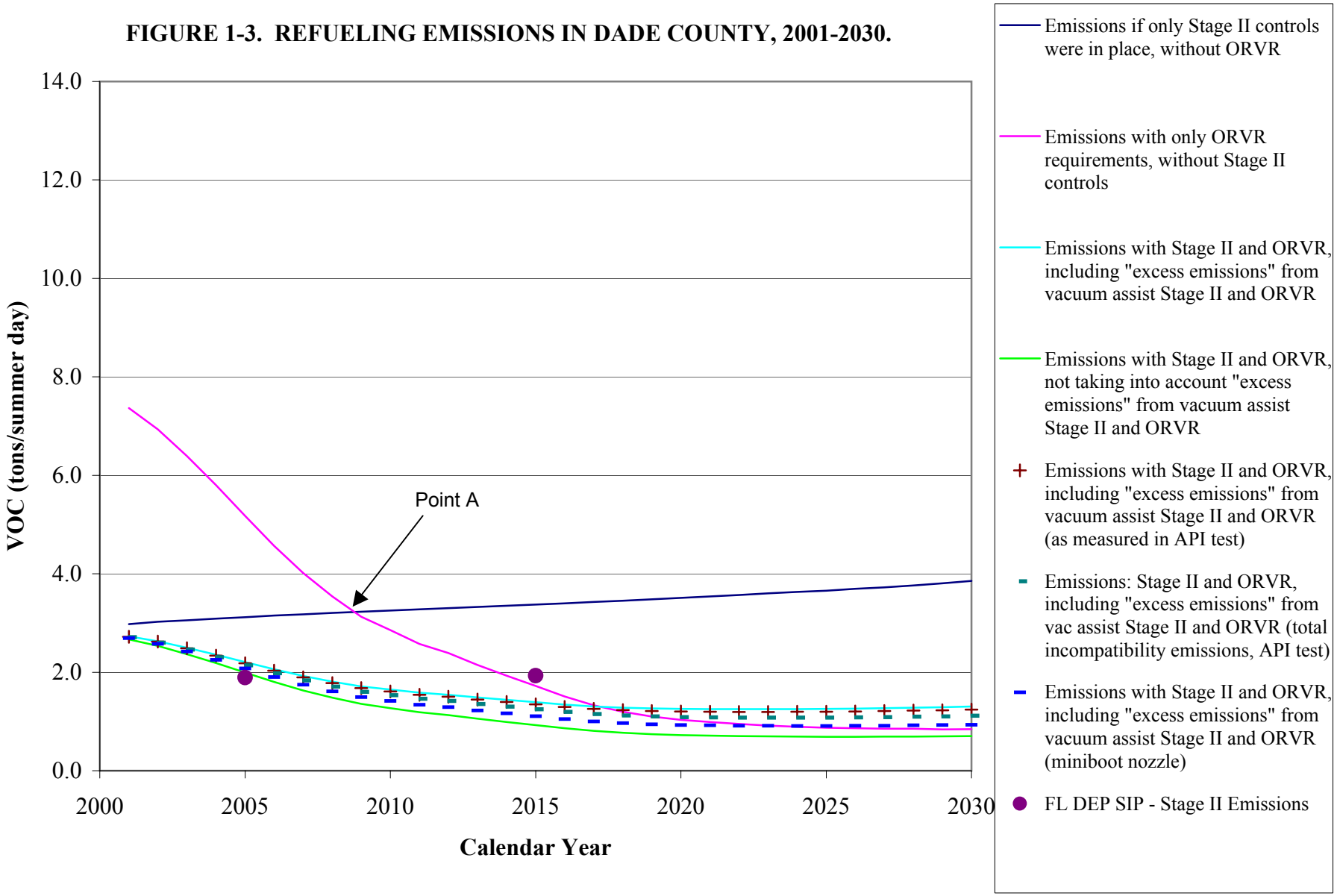
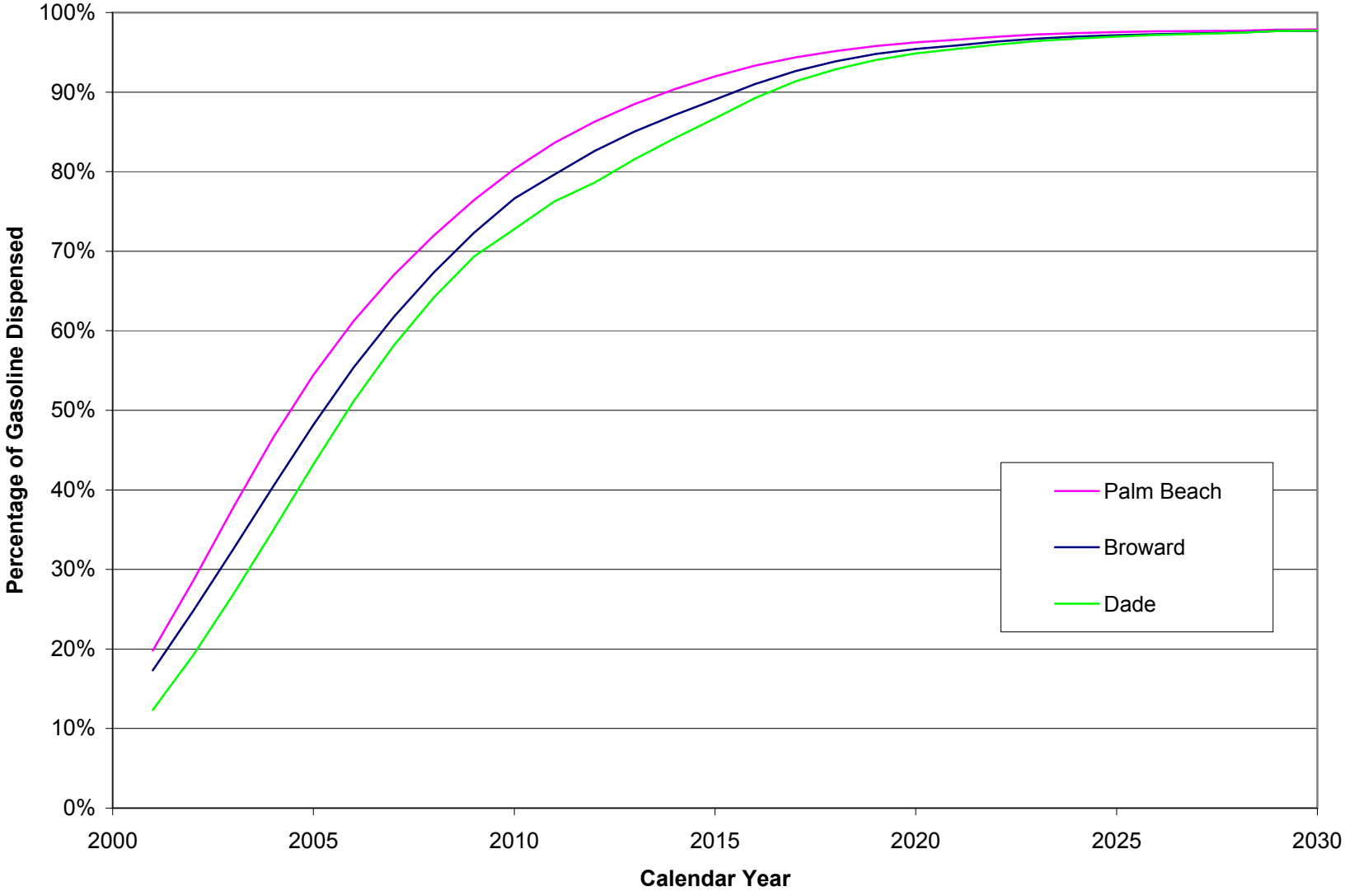
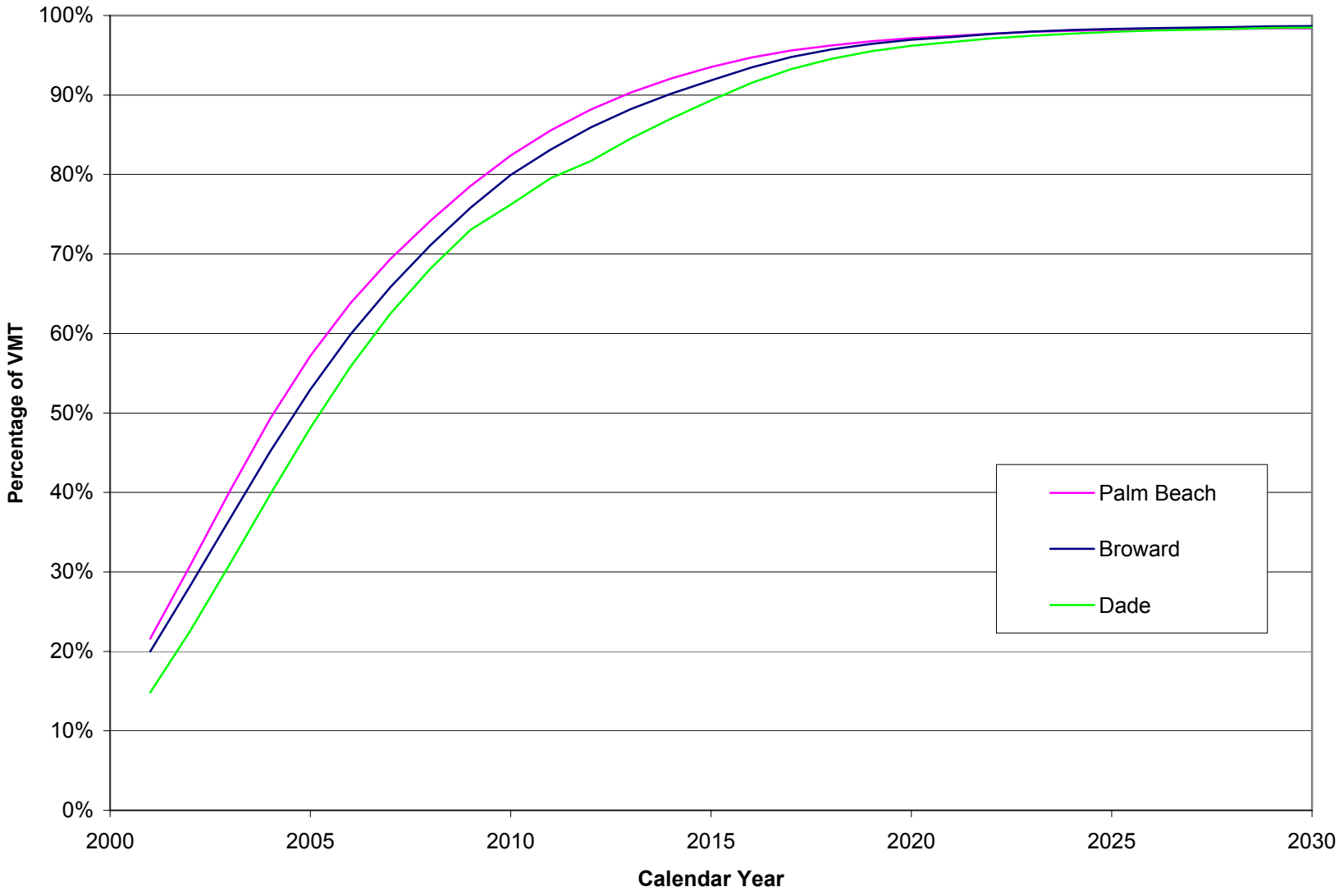


FIGURE 1-4. PERCENTAGE OF GASOLINE DISPENSED TO ORVR-EQUIPPED VEHICLES.



FL report tables and figs.xls, Fig 1-4

FIGURE 1-5. PERCENTAGE OF VMT FROM ORVR-EQUIPPED VEHICLES.



FL report tables and figs.xls, Fig 1-5

Figure 1-6. Calculated Cost of Maintaining Stage II as ORVR Penetrates Vehicle Population for Florida Stage II Areas (includes CARB estimate of incompatibility excess emissions)

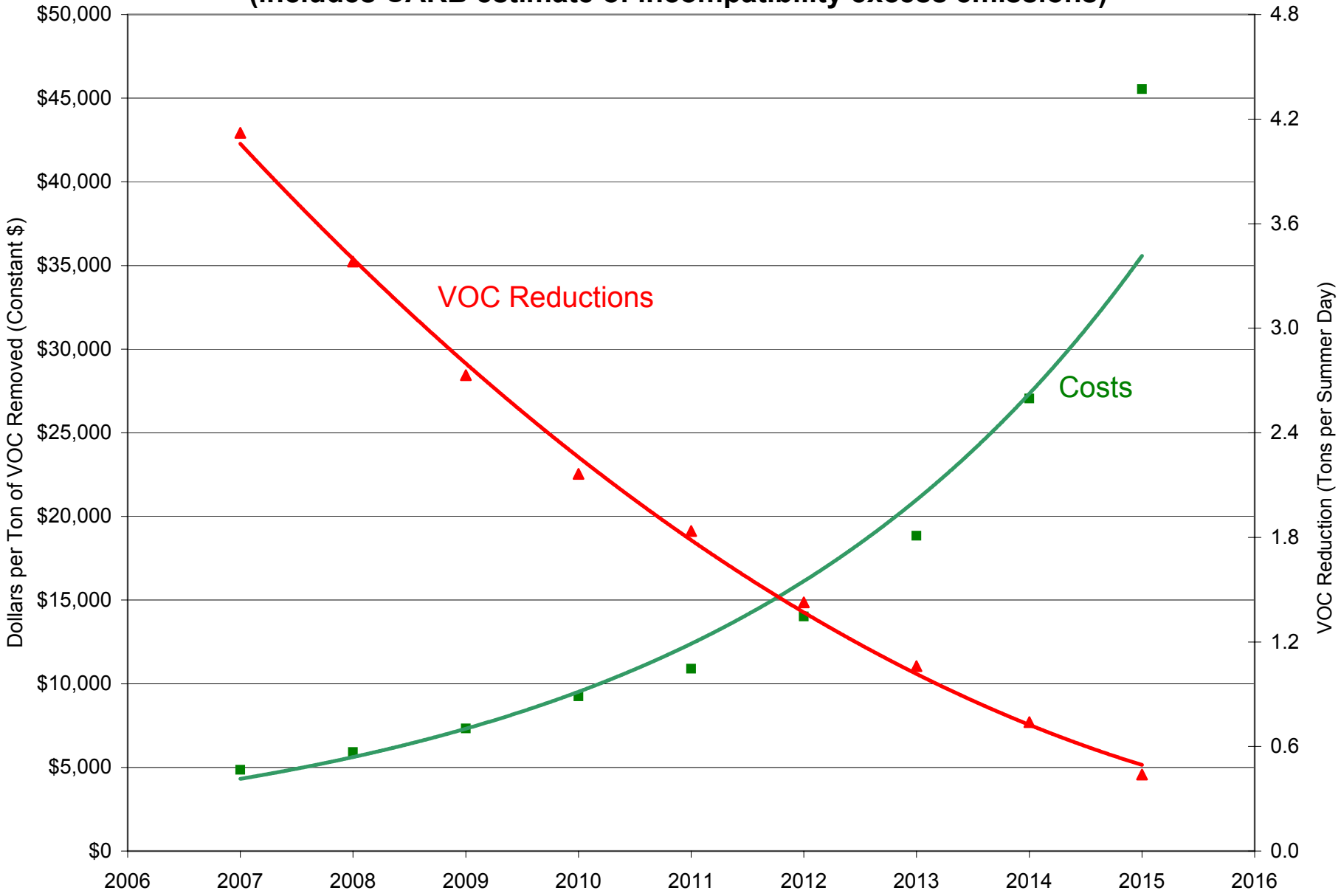
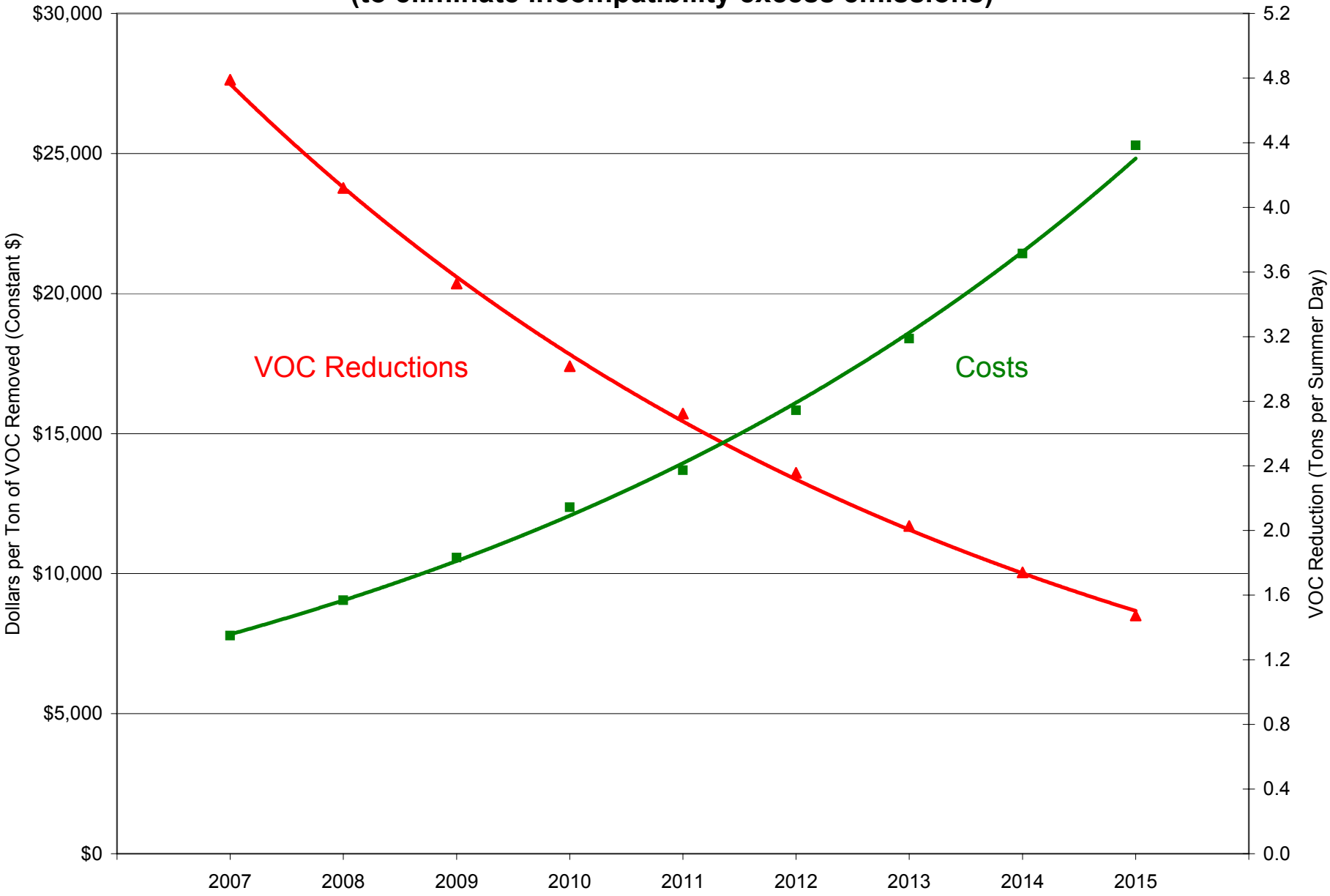


Figure 1-7. Calculated Cost of Eliminating Stage II - ORVR Incompatibility Through Vapor Processor Retrofits for Florida Stage II Areas (to eliminate incompatibility excess emissions)



2.0 INTRODUCTION

In general, gasoline vapors emitted from vehicle refueling operations are required to be controlled because they are classified as "volatile organic compounds" (VOC). In the summertime,[3] VOC participate in photochemical reactions with oxides of nitrogen (NO_x) to form ozone (O_3) in the troposphere. The Environmental Protection Agency (EPA) has developed a National Ambient Air Quality Standard (NAAQS) for ozone; areas of the country that do not comply with this NAAQS ("nonattainment areas") are required to reduce summertime emissions of VOC and/or NO_x in order to comply. In Florida, the tri-county Southeast Florida Airshed, which includes Palm Beach, Broward, and Dade counties, was originally designated as moderate nonattainment, but was later redesignated to maintenance as of April 25, 1995. Stage II VRS are installed in Palm Beach, Broward, and Dade counties, which are shown in Figure 2-1.

The Florida State Implementation Plan (SIP) attainment demonstration was submitted to EPA in November 1993 and since then the Southeast Florida Airshed has prepared air quality maintenance plans to help maintain attainment status. FDEP's projections of VOC emissions in 2005 for Palm Beach, Broward, and Dade counties are shown in Figure 2-2 and range from a total of 329 tons per day (tpd) for Broward to 549 tpd for Palm Beach.[4]

2.1 Regulatory Requirements for Vehicle Refueling Emission Controls

Sections 182(b)(3) and (c)-(e) of the Clean Air Act requires gasoline dispensing facilities (GDFs) in nonattainment areas classified as "Moderate," "Serious," "Severe, or "Extreme" to install and operate vapor recovery systems (VRS) to capture vapor displaced from vehicles' fuel tanks as they are filled. These VRS are commonly referred to as "Stage II" systems ("Stage I" refers to vapor recovery systems applied to gasoline transfers from tanker trucks to GDFs) and are certified to be 95% effective at capturing displaced vapors. Only GDFs with average monthly throughputs of less than or equal to 10,000 gallons, "independent small business marketers" with average monthly throughputs of less than or equal to 50,000 gallons, and marinas/marine vehicles are exempted from these requirements.

Florida SIP Chapter 62-252 covers Gasoline Vapor Control, and Chapter 62-252.400 refers to Stage II VRS. As shown in Figure 2-1, Palm Beach, Broward, and Dade, the three counties that used to be classified as nonattainment areas, comply with the VRS requirements in the Clean Air Act. Florida's Stage II regulations (Chapter 62-252.400) exempt facilities with average monthly throughputs of less than or equal to 10,000 gallons (with some additional exemptions for small independent facilities, as allowed by the Clean Air Act).

Separately, Section 202(a)(6) of the Clean Air Act also requires vehicle manufacturers to equip new vehicles nationwide with onboard refueling vapor recovery (ORVR) systems (at least 95% efficient), in accordance with the following schedule:

---

[3]The "ozone season" includes the months of May through September.

[4] Air Quality Maintenance Plan (2005-2015) Dade, Broward, and Palm Beach Counties, Florida Department of Environmental Protection Division of Air Resource Management, December 2002.

ORVR Mandate (% of Vehicles Sold)	Model Years (MY) for Which ORVR Mandate Must Be Met[5]				
	Light-Duty Vehicles[6]	Light Light-Duty Trucks[7] (0-6,000 lb)	Heavy Light-Duty Trucks[7] (6,001-8,500 lb)	Medium Duty Passenger Vehicles[8] (8,501-10,000 lb)	Complete Heavy Duty Vehicles[9] (8,501-10,000 lb)
40%	1998	2001	2004	2004	2004[10]
80%	1999	2002	2005	2005	2005
100%	2000+	2003+	2006+	2006+	2006+

These systems incorporate a carbon canister on vehicles that adsorbs gasoline vapors displaced during refueling and desorbs them during vehicle operation, at which time they are destroyed in the engine. ORVR systems are required to be 95% effective at reducing refueling emissions from ordinary GDFs (not equipped with Stage II VRS) and Federal test procedures require that "refueling emissions" include both vapor displacement and spillage during refueling. Section 202(a)(6) continues on to state that when EPA promulgated the ORVR standards in 1994, Stage II VRS were no longer required in ozone nonattainment areas classified as Moderate, and that the EPA Administrator "may...waive the application of the requirements [for GDF vapor recovery systems in nonattainment areas classified as Serious, Severe, or Extreme]...after such time as the Administrator determines that [ORVR] systems...are in widespread use throughout the motor vehicle fleet." The term "in widespread use" was originally not formally defined, but EPA had indicated that it would be based upon either "the percentage of the automobile fleet equipped with ORVR," or "when ORVR achieves emissions reductions on a one-to-one basis when compared to Stage II."[11] EPA is considering four different means of identifying "widespread use" of ORVR: "when "x" percent of the vehicles in service are ORVR-equipped"; "when "x" percent of the vehicle miles traveled (VMT) are from ORVR-equipped vehicles"; "when the total VOC emissions from refueling vehicles (without Stage II) are equal to the total VOC emissions

[5]ORVR phase-in schedule is included in 40 CFR 86.1810-01(k) for light-duty vehicles and light-duty trucks; extended to medium-duty passenger vehicles in §86.1811-04(e)(3)(iii).

[6]Defined as "a passenger car or passenger car derivative capable of seating 12 passengers or less" (40 CFR 86.1803-01).

[7]"Light Duty Trucks" (LDT's) are defined as "any motor vehicle rated at 8,500 pounds GVWR or less which has a curb weight of 6,000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less, which is: (1) designed primarily for purposes of transportation of property or is a derivative of such a vehicle; or (2) Designed primarily for transportation of persons and has a capacity of more than 12 persons; or (3) Available with special features enabling off-street or off-highway operation and use." LDT's are subdivided into "Light Light-Duty Trucks" (up to 6,000 lb GVWR) and "Heavy Light-Duty Trucks" (6,001-8,500 lb GVWR).

[8]Defined as "any [vehicle rated at more than 8,500 lb GVWR or that has a vehicle curb weight of more than 6,000 lb or that has a basic vehicle frontal area in excess of 45 sq. ft.] with a [GVWR] or less than 10,000 pounds that is designed primarily for the transportation of persons."

[9]Defined as "any Otto-cycle [vehicle rated more than 8,500 lb GVWR or that has a vehicle curb weight of more than 6,000 lb or that has a basic vehicle frontal area in excess of 45 sq. ft.]...that has the primary load carrying device or container attached at the time the vehicle leaves the control of the manufacturer of the engine."

[10]Manufacturers can choose a compliance option that eliminates the refueling standards for 2004 for this vehicle type [§86.1816-05(e)(3)].

[11]Letter from Jason Grumet (NESCAUM) to Tom Helms and Gregory Green (EPA), October 11, 2001.

from refueling vehicles with Stage II but without ORVR"; or "when "x" percent of the gasoline sold is dispensed to ORVR-equipped vehicles.[12]

2.2 Stage II Equipment – Existing Types and Functionality

The two most prevalent types of Stage II VRS are referred to as "vapor balance" and "vacuum assist." As fuel is added to a vehicle's tank, gases in the tank headspace (which can consist of approximately 30-40% gasoline vapor and 60-70% air in the summer) are displaced. The "vapor balance" system, configured with a corrugated bellows ("boot") over the nozzle spout designed for capturing vapor, has been in use since vapor recovery was first required. The vapor balance system operates based on the principal of vapor displacement, providing a vapor recovery return line to collect vapors from the vehicle fuel tank pushed out by the incoming liquid gasoline. It depends on an adequate seal being established between the vehicle being refueled and the faceplate of the fueling nozzle. The vapors then go through a bellows surrounding the nozzle to piping back to the gasoline storage tank.

Vacuum assist systems do not require a boot that makes a tight fit during refueling; instead, the GDF utilizes a vacuum system to "pull" the gases back through perforations in the nozzle spout to the headspace of the GDF's storage tank. For these systems, the GDF's storage tank is required to be equipped with a pressure/vacuum (P/V) valve, which is designed to open only if the pressure inside the tank increases to more than 3" water column (w.c.) above atmospheric pressure or decreases to less than 8" w.c. below atmospheric pressure. The ratio of the volume of air and vapor returned (A) to the volume of liquid dispensed (L) is referred to as an "A/L ratio" or simply "A/L." Vacuum assist VRS are certified at A/L ratios from 0.85 to 1.20, with the exception that a small percentage of vacuum assist systems are equipped with destructive processors (i.e., that thermally oxidize the vapors) and have significantly higher A/L ratios (from 1.35 to 2.4). Some vacuum assist systems use a "mini-boot" to enable the systems to run at slightly lower A/L ratios.

2.3 Description of ORVR Systems

The primary component of ORVR systems is a carbon canister located within the vehicle. As the vehicle fuel tank is filled, the canister adsorbs the gasoline vapors displaced from the tank headspace. As stated previously, in warm weather, the vehicle tank headspace generally contains 30-40% (by volume) hydrocarbon vapor (exact concentrations depend upon the gasoline volatility and temperature), with air accounting for the remaining volume. The adsorbed vapor is then desorbed during vehicle operation and destroyed in the engine.

EPA regulations require that ORVR canisters keep refueling emissions at or below 0.20 grams per gallon of gasoline dispensed throughout the full useful life[13] of the vehicles, and this durability is required to be demonstrated [40 CFR 86.1825-01]. EPA's refueling emissions test

[12] U.S. Environmental Protection Agency, Stage II vapor recovery systems issues paper. U.S. EPA Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division, Emissions Factors and Policy Applications Group (D243-02), August 12, 2004

[13] EPA defines "full useful life" in 40 CFR 86.1805-01 and 86.1805-04; although the exact definition varies for vehicle types, the minimum definition is 10 years or 100,000 miles.

procedures include measurement of both the vapor displaced during refueling and the evaporation of any liquid spillage that occurs [40 CFR 86.107-98(e)(5)].

2.4 Vacuum Assist Stage II-ORVR "Excess Emissions"

The California Air Resources Board (CARB) has noted that there is a potential for "excess emissions" when vacuum assist Stage II VRS are used to refuel vehicles equipped with ORVR. Specifically, because the ORVR systems remove much of the vapors that vacuum assist Stage II systems are designed to pull back, the vacuum assist systems create negative pressure in the fill pipe, which can cause the liquid seal to break. If this occurs, ambient air from the vicinity of the GDF nozzle/fill pipe interface will be drawn back into the GDF storage tank. Because this dilutes the concentration of gasoline vapor in the headspace of the storage tank, a portion of the liquid gasoline in the storage tank will volatize and increase the partial pressures of the gasoline constituents towards their equilibrium values. This causes the total pressure in the storage tank to rise and if the gauge pressure increases above the positive setting of the P/V valve (typically, 3" w.c.), the storage tank will vent to the atmosphere. Quantification of these emissions will be discussed in further detail in Section 3.2.

Figure 2-1. FLORIDA AREAS WITH STAGE II: FORMER NONATTAINMENT AREAS.

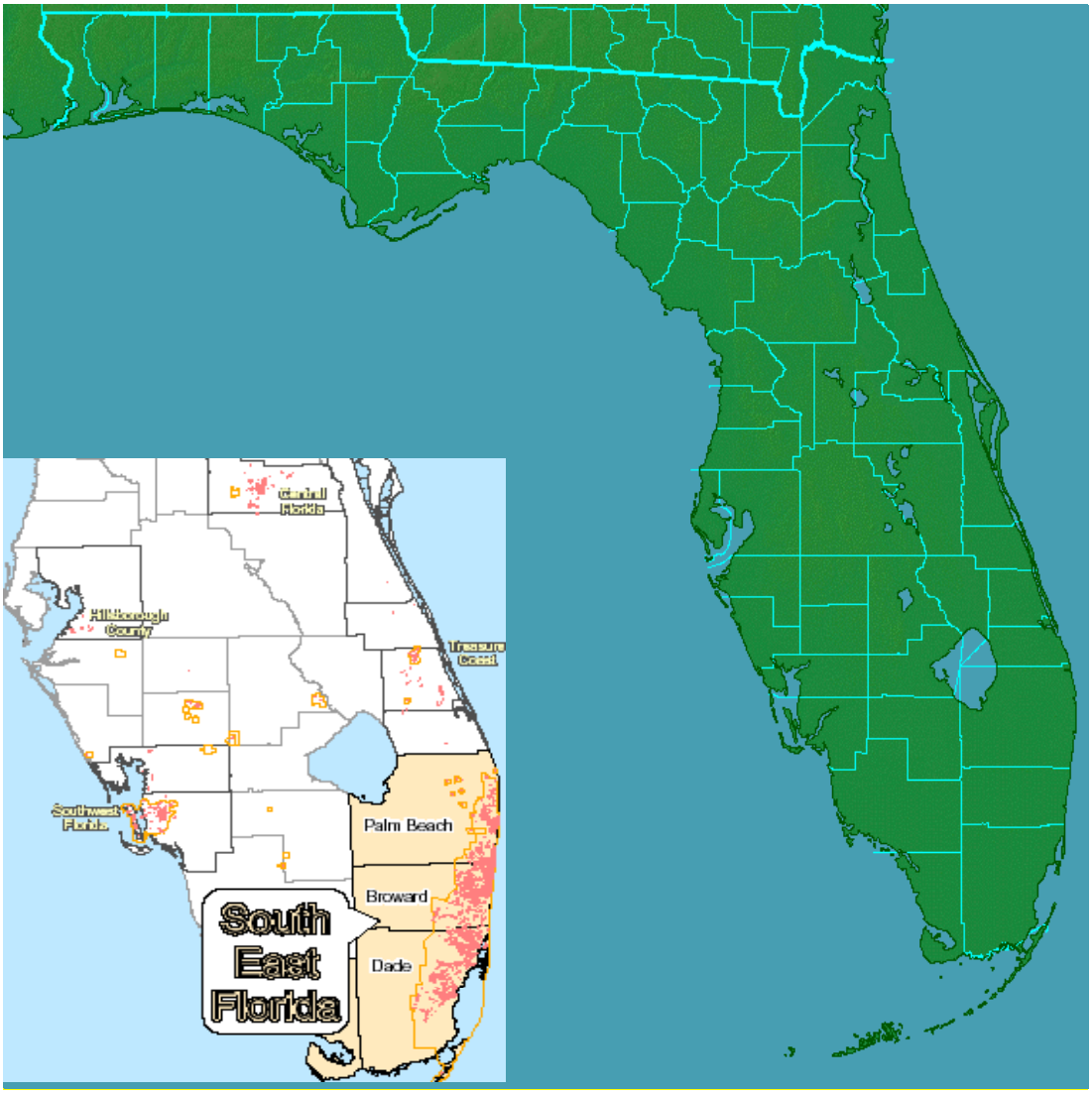
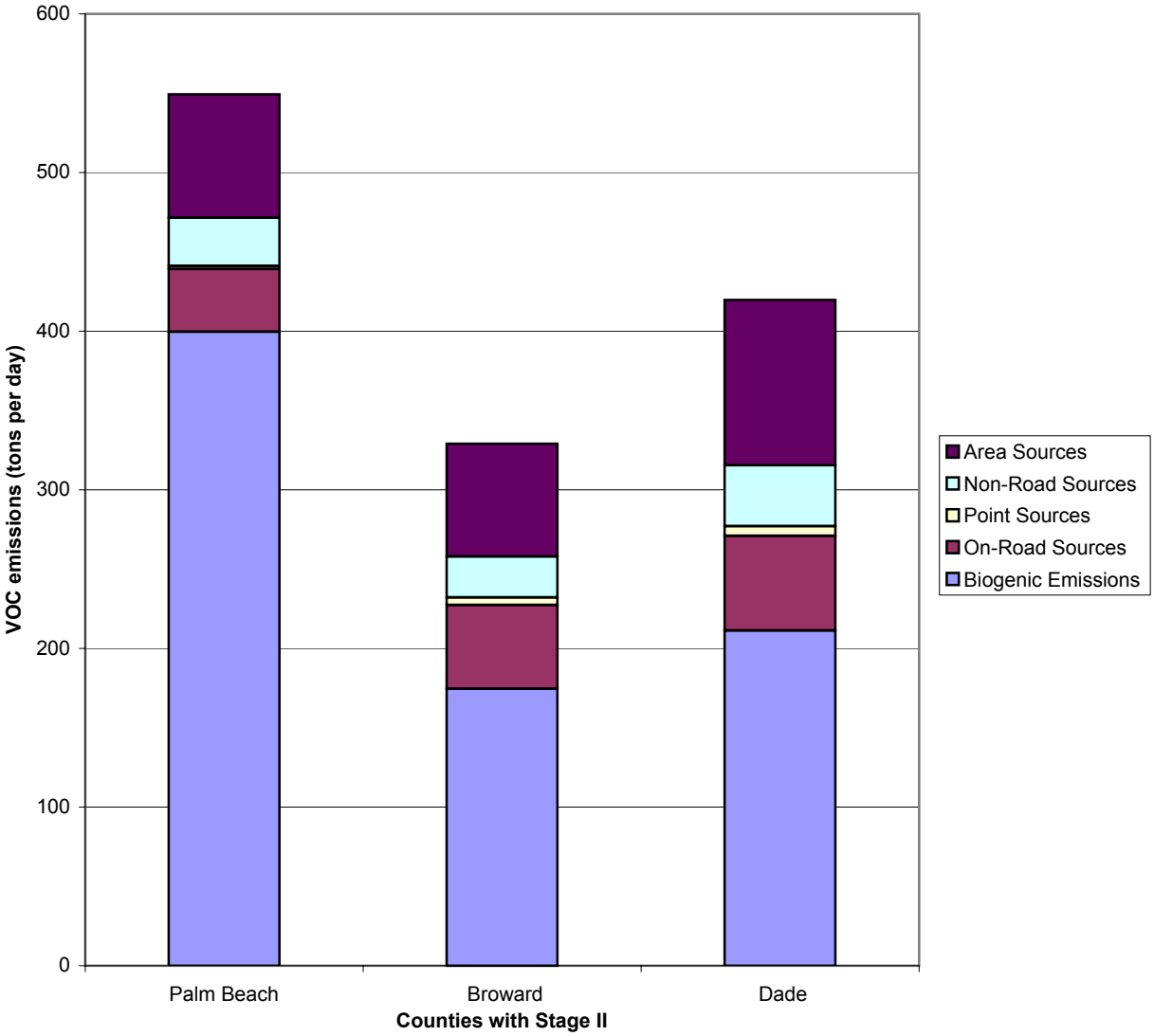


Figure 2-2. 2005 VOC EMISSION INVENTORIES



Reference: "Air Quality Maitenance Plan (2005-2015) Dade, Broward and Palm Beach Counties." Florida Department of Protection Division of Air Resource Management, December 2002.

3.0 METHODOLOGIES FOR EMISSIONS CALCULATIONS

Refueling emissions are calculated by multiplying a refueling emissions factor (lb VOC per 1000 gallons dispensed, or grams VOC per gallon dispensed) by a gasoline throughput (gallons per summer day).

The most recent EPA vehicle refueling emissions inventory guidance[14] requires that EPA's MOBILE models be used to determine refueling emissions factors. Tech Environmental has developed a spreadsheet that reproduces data from EPA's MOBILE6 model and adds in "excess emissions" from ORVR-equipped vehicles refueled by vacuum assist Stage II systems. The MOBILE methodologies for emission factors are identified in Section 3.1. The California Air Resources Board (CARB) is currently the only state to have published estimates of "excess emissions" from vacuum assist Stage II-ORVR "incompatibility"; these methodologies are discussed further in Section 3.2. The American Petroleum Institute (API) has also sponsored a study and estimates of "excess emissions" from vacuum assist Stage II-ORVR "incompatibility are discussed in Section 3.2. Section 3.3 addresses methodologies for estimating gasoline throughputs, and Section 3.4 summarizes the methods used by Tech Environmental to calculate emissions.

3.1 MOBILE Emission Factors

MOBILE assumes that refueling emissions factors have two components: vapor displacement (which is a function of gasoline volatilities and temperatures) and spillage.[15] Three more recent versions of MOBILE (5ah, 5b, and 6) discussed in this section all use the same basic algorithms for calculating emission factors for individual vehicles, but have different assumptions regarding the use of daily minimum and maximum temperature data and vehicle types (as will be discussed in more detail below). The latest version of MOBILE (MOBILE6.2) is comparable to MOBILE6 for calculating refueling emissions. EPA has stated that MOBILE6 should be used

> "where SIP development is in it initial stages or has not progressed far enough along that switching to MOBILE6 would create a significantly adverse impact on State resources. For example, SIPs that will be submitted later in 2002 should be based on MOBILE6 since there is adequate time to incorporate the new model."[16]

3.1.1 Uncontrolled Vapor Displacement Emission Factors

MOBILE (including versions 5ah, 5b, and 6) incorporates an awareness that the quantity of vapor displaced depends upon both temperature and gasoline volatility (Reid Vapor Pressure), and incorporates the following equation from EPA's AP-42 publication[17]:

---

[14]Eastern Research Group, STAPPA/ALAPCO/EPA Emissions Inventory Improvement Program (EIIP) Volume III, Chapter 11, "Gasoline Marketing (Stage I and Stage II)," Revised Final, January 2001.

[15]CARB introduced evaporative emissions from hanging hoses of 0.048 lb/1000 gal as a third component to refueling emissions; however, given the fact that this component is an order of magnitude less than the vapor displacement and spillage components and is not affected by Stage II VRS or ORVR, it is not being considered here.

[16]John S. Seitz (EPA), "Policy Guidance on the Use of MOBILE6 for SIP Development and Transportation Conformity," January 18, 2002.

[17]US EPA, "Compilation of Air Pollutant Emission Factors," AP-42, Chapter 5, Section 5.2.2.3 (rev. 1/95).

$$E_R = (-5.909) - 0.0949\ (\Delta T) + 0.0884\ (T_D) + 0.485\ (RVP) \qquad (3\text{-}1)$$

where

E_R = emissions factor in grams VOC per gallon transferred (g/gal)
ΔT = difference between temperature of fuel in vehicle tank and temperature of dispensed fuel, ^oF
T_D = temperature of dispensed fuel, ^oF
RVP = Reid Vapor Pressure, pounds per square inch, actual (psia)

This formula has been incorporated into EPA's MOBILE models (including versions 5ah, 5b, and 6), and, rather than the fixed emissions factor. The MOBILE models also assume that T_D is equal to the ambient temperature[18] and that

$$\Delta T = 0.418 * T_D - 16.6^oF^{19} \qquad (3\text{-}2)$$

so that E_R becomes of a function solely of ambient temperature and RVP (inputs to the MOBILE model).

Versions 5ah and 5b of MOBILE calculated emissions at a single temperature: the average of the minimum and maximum daily temperatures identified by the program user. MOBILE6 calculates temperatures for each hour of the day by assuming that the minimum temperature identified by the user occurs at 6 AM, the maximum temperature occurs at 3 PM, and temperatures for other hours are based upon a typical diurnal temperature variation (the algorithm for which is included in the MOBILE6 source code). MOBILE6 then calculates emissions for each hour of the day, and later takes a weighted average of all the values (using a weighting factor which represents the fraction of VMT traveled during each hour of the day) to calculate average emissions for that day.

Tech Environmental duplicated the calculations in MOBILE6 by calculating temperature and uncontrolled emissions for each of the 24 hours of the day, and then averaging the uncontrolled emissions using the MOBILE6 weighting factor. As a result, controlled emissions only needed to be calculated based upon the daily average uncontrolled emissions factor, rather than for each of the 24 hours per day.

3.1.2 Stage II and ORVR Control of Vapor Displacement Emissions

MOBILE makes the following assumptions regarding the control of vapor displacement emissions by ORVR and Stage II VRS:

1. If ORVR is present on the vehicle and has not been tampered with, uncontrolled displacement emissions are reduced by 98%, and no additional reductions are assumed for Stage II VRS. (If ORVR is present but has been tampered with, it is assumed to have no effect on displacement emissions.)

[18]For ambient temperatures of 95°F and above, the model restricts T_D to a value of 95°F.
[19]If ΔT is calculated as being greater than 20°F, MOBILE sets ΔT equal to 20°F.

2. If a Stage II program is in effect, it controls displacement emissions from both non-ORVR cars and ORVR cars that have been tampered with by the "in-use control efficiency" identified by the user.

The Stage II "in-use control efficiency" is the product of three percentages: (1) the control efficiency (CE) of properly implemented Stage II equipment (95%); (2) the rule effectiveness (RE), which is a measure of the extent to which there is compliance with the requirements for Stage II equipment; and (3) the rule penetration (RP), which is a measure of the extent to which the requirements apply to all GDFs. MOBILE allows program users to enter separate in-use control efficiencies for light-duty vehicles (LDVs) and heavy-duty vehicles (HDVs) to account for the fact that HDVs are more likely to be centrally refueled, and these refueling stations might have low enough throughputs to be exempted from Stage II requirements.

Version 5ah of MOBILE did not include the implementation schedule for ORVR; users could only choose to model fully implemented ORVR or no ORVR. MOBILE5ah is therefore clearly inadequate for modeling the effects of ORVR.

Version 5b of MOBILE included an ORVR implementation schedule, but this schedule was imperfect because of the fact that ORVR is implemented on some but not all heavy-duty gasoline-fueled vehicles (i.e., not those larger than 10,000 lb GVWR), whereas MOBILE5b lumps all gasoline-fueled vehicles larger than 8,500 lb GVWR together into a single vehicle type ("HDGV"). EPA therefore conservatively did not include the implementation of ORVR on any of the heavy-duty vehicles.

Version 6 of MOBILE uses different vehicle types from the previous versions, with nine different classes of heavy-duty gasoline-fueled vehicles. Because of this, MOBILE6 can properly model the requirements for ORVR.

With respect to tampering, EPA has previously developed "tampering rates" for evaporative canisters used to control diurnal evaporative emissions on model year 1984 and later vehicles. Figure 3-1 shows that these rates are not significant for the light-duty ground vehicles that make up the majority of the vehicle fleet, or for newer vehicles. However, Section 2.8.9.3 of the MOBILE6 User's Guide[20] states that "All 1996 and newer model year vehicles are assumed to have negligible tampering effects"; i.e., tampering rates would be zero for all vehicles that would be equipped with ORVR (model year 1998 and later). EPA staff also asserted that the TEX1.FOR subroutine of MOBILE6 set tampering rates for model year 1996 and later vehicles to zero; however, Tech Environmental read through the program code and ran sample runs of MOBILE6 to show that for refueling emissions, tampering subroutines are still in operation for all vehicles except the oldest model year (i.e., 24-year-old vehicles), and EPA later confirmed this.[21] Therefore, in order to use MOBILE6 to properly model the fact that there is no tampering, users should add in a line of code for a 100% effective anti-tampering program (as per Section 2.8.9.3 of the MOBILE6 User's Guide).

[20]US EPA, "User's Guide to MOBILE6.0 Mobile Source Emission Factor Model," 420R-02-001, January 2002.
[21]Dave Brzezinski (US EPA), telephone conversations with Robert Rossi (Tech Environmental), March 15-21, 2002.

3.1.3 Emission Factors for Spillage

All versions of EPA's MOBILE model have assumed that uncontrolled spillage emissions are 0.68 lb/1000 gal (0.31 g/gal), which is consistent with the AP-42 publication and based upon studies conducted in the 1970's.[22] Stage II VRS is assumed to not control these emissions, but vehicles equipped with ORVR are assumed to have 50% lower spillage emissions (regardless of whether the ORVR canister has been tampered with), assumedly as a result of changes to the fill pipe. (Specifically, spill emissions of 0.31 g/gal would automatically fail the EPA requirement that total refueling emissions be 0.20 g/gal or lower, as mentioned in Section 2.3.) California has utilized a spillage emissions factor of 0.42 lb/1000 gal (0.19 g/gal) based upon a more recent study[23] and does not assume that ORVR affects spillage emissions. For consistency with the MOBILE models (which do not allow users to alter the spillage emissions factor) and EPA's refueling emissions regulations, Tech Environmental has used EPA's methodology for calculating spillage emissions.

3.1.4 Combining Data for Individual Vehicle Types and Models

Since Stage II in-use efficiencies can vary with vehicle type and ORVR implementation is a function of vehicle type and model year, the calculations described in Sections 3.1.1 through 3.1.3 are conducted for all vehicle ages and all vehicle types and then combined to obtain an aggregate emissions factor for each vehicle type.

As mentioned in Section 3.1.2, MOBILE5ah and MOBILE5b utilized eight vehicle types; MOBILE6 has 28 vehicle types. When vehicle age distributions (which differ by vehicle type) and the distribution of total vehicle miles traveled among the different vehicle types ("VMT Mix") were given in terms of the eight MOBILE5 vehicle types, Tech Environmental converted these distributions to MOBILE6 vehicle types in accordance with the formulas and tables in Chapter 5 of the MOBILE6 User's Guide.[20]

Within each vehicle type, the vehicle age distributions are combined with MOBILE6 default travel fractions—which account for the fact that vehicles of different ages typically travel a different number of miles per year—to determine the overall travel fractions, i.e., the extent to which vehicle miles were traveled by each age of vehicle. Emission factors in grams per gallon (g/gal) are divided by MOBILE6 default fuel economies (which depend upon vehicle type and model year) to convert them into units of grams per mile (g/mi); the overall emissions factor for the vehicle type is then calculated as an average of these values, weighted by the overall travel fraction. (For heavy-duty vehicle types not required to have ORVR, refueling emissions expressed in g/gal were identical for all ages; Tech Environmental combined these into a single group and divided by the weighted average fuel economy to obtain the average emission factor in g/mi for these vehicles.)

---

[22] M. Smith (Scott Research Laboratories), "An Investigation of Passenger Car Refueling Losses," SAE Technical Paper No. 720931.

[23] J.J. Morgester et al., "Comparison of Spill Frequencies and Amounts at Vapor Recovery and Conventional Service Stations in California," *J. Air Waste Manage. Assoc.* **42**: 284-289 (1992); the value of 0.42 lb/1000 gal was based upon tests at VRS-equipped service stations only and did not include "drops" (spills < 1 mL). Tests at conventional service stations resulted in a value of 0.61 lb/1000 gal, but this result was strongly affected by a very large spill event (subtraction of this event resulted in an emissions factor very close to 0.42 lb/1000 gal).

MOBILE includes options which allow for output of the emissions factor for each vehicle type in units of either (g/gal) or (g/mi). EPA's recommended approach for calculating refueling emissions[14] is to use factors expressed in (g/gal) and multiply by gasoline throughput; although it is also possible to use factors expressed in (g/mi) and multiply by VMT, this is not the preferred methodology (since actual measurements of gasoline usage are presumed to be more accurate than gasoline usage calculated based upon the default fuel economies and travel fractions in the MOBILE models). Tech Environmental uses the preferred approach to calculate emissions, but notes that this is not straightforward for agencies running the MOBILE models because the information regarding the extent to which different vehicle types are used (the VMT Mix) is on the basis of miles traveled, not gallons consumed. In order to determine the fraction of gasoline used by each of the different vehicle types, each type's VMT fraction needs to be divided by that type's average fuel economy (MOBILE6 provides this information) to obtain a measure of that type's fuel consumption (per total vehicle miles traveled).

3.1.5 Validation of Tech Environmental's Model Against MOBILE6

MOBILE6 runs were conducted for 2007 (i.e., during ORVR phase-in, including some vehicle ages with 100% ORVR and some with 0% ORVR penetration) and 2028 (i.e., well after ORVR phase-in) to confirm whether they matched the spreadsheet results (without ORVR incompatibility), for each vehicle type. Validation runs were conducted assuming reformulated gasoline (RFG) was being used, that minimum and maximum summer day temperatures were 71°F and 96°F, respectively, and that the Stage II in-use efficiency was 76% for all vehicle types.

Age-specific results (which have only become available with MOBILE6; they were not available for MOBILE5) for calendar year 2007 are shown in Figure 3-2 (data for vehicle ages over 12 are identical and are not shown); age-specific results for calendar year 2028 are shown in Figure 3-3 (with the y-axis expanded to see small differences). It can clearly be seen that the Tech Environmental spreadsheet results are essentially a perfect match with the MOBILE6 results, as long as tampering effects are considered. The one exception to this is the MOBILE6 tampering "quirk" for vehicles of age 24 (mentioned in Section 3.1.2) is clearly visible on the right side of Figure 3-3. The effects of ignoring tampering are clearly more significant for later calendar years for non-LDGV vehicle types, as ORVR vehicles become older. Table 3-1 confirms that the spreadsheet correctly reproduces the composite emission factors from MOBILE6.

3.2 "Excess Emissions" from Vacuum Assist Stage II-ORVR

As described in Section 2.4, CARB has identified that the potential for "excess emissions" exists when vacuum assist Stage II systems are used to refuel vehicles equipped with ORVR. In May of 1998, Healy Systems, a supplier of "ORVR compatible" vacuum-assisted Stage II equipment, estimated that these "excess emissions" could be as high as 5.13 lb/1000 gal, based upon equilibrium calculations.[24] However, actual experiments conducted by CARB and sponsored by API showed that these estimates were unreasonably high.

[24]James W. Healy (Healy Systems, Inc.), "Environmental Impact of ORVR Vehicles on Vacuum Assist Phase II Vapor Recovery/Financial Impact to Make Existing Vacuum Assist Phase II Vapor Recovery Systems ORVR Compatible," May 21, 1998; the emissions factor of 5.13 lb/1000 gal is calculated from Healy's data showing 6.16 tons VOC/year of excess emissions from a vacuum assist station transferring 200,000 gal/month.

3.2.1 CARB Test Data and Estimates of "Excess Emissions"

CARB based their most recent estimates of "excess emissions" on testing conducted in August and September of 1998. Specifically, CARB conducted experiments on two GDFs dispensing gasoline with an RVP of 7.8 psia, equipped with vacuum assist Stage II VRS: a Gilbarco Vapor Vac system (certified for A/L of 1.0 to 1.2) and a Wayne Vac system (certified for A/L of 0.9 to 1.1). The latter was tested under two conditions: (1) with the P/V valve on its underground storage tank intact, and (2) with the P/V valve removed, so that the effects of having a functional P/V valve could be quantified. At the time of the testing, very few vehicles were equipped with ORVR, so ORVR was simulated in the VRS by altering the electronics and/or valving of the VRS so that (1) the vacuum assist pumps were drawing in ambient air, and (2) air and vapor displaced from the vehicle tank were vented to atmosphere, rather than back to the underground storage tanks. The test report for this study has never been finalized, but on page 8 of the draft report,[25] CARB noted:

> "[by] defeating VRS components in this manner...the effect of ORVR vehicles on the VRS may be over estimated. Prior testing by ARB demonstrated that most liquid seal ORVR systems return a vapor mixture containing 2%-13% hydrocarbons to the VRS [instead of the assumedly 0% hydrocarbon stream that is returned to the VRS by forcing it to draw in ambient air]."

No correction is made for this bias, or the fact that the vacuum may draw air more rapidly from an open nozzle than one that is inserted into an ORVR vehicle—i.e., due to the fact that initially, the VRS is assumed to be creating a vacuum (negative pressure) condition in the fill pipe.

Furthermore, because CARB was not interested in total refueling emissions as much as the relative effects of ORVR (and the removal of the P/V valve), only emissions from the underground storage tank were quantified. Those from the nozzle/fill pipe interface were not measured, and this would not have been possible anyway for the ORVR simulations (because of the way the VRS equipment was modified to simulate ORVR). However, given that emissions from the nozzle/pipe interface are probably less than usual when fueling ORVR vehicles with the vacuum assist Stage II equipment (i.e., because this equipment generates a negative pressure in the vicinity of the interface), still more bias towards overestimating the effects of ORVR on total refueling emissions is introduced.

When the P/V valve was absent, CARB simply measured emissions from the underground storage tank (UST) vent. For the tests with the P/V valves left intact, CARB calculated emissions by summing (1) emissions measured at the P/V valve and (2) fugitive emissions, calculated by multiplying headspace hydrocarbon concentrations (measured with Summa canisters) by average fugitive leak rates (calculated for each hour of testing based on a leak rate versus pressure curve and hourly average VRS pressures). In all of the tests conducted with the P/V valves intact, the emissions measured at the P/V valve were insignificant compared to the calculated fugitive emissions.

---

[25]CARB, Preliminary Draft Test Report: Total Hydrocarbon Emissions from Two Phase II Vacuum Assist Vapor Recovery Systems During Baseline Operation and Simulated Refueling of Onboard Refueling Vapor Recovery (ORVR) Equipped Vehicles," Project Number ST-98-XX, June 1999.

Results from the draft test report are plotted in Figure 3-4. Although refueling emissions from the storage tank did increase with the (simulated) percentage of ORVR-equipped vehicles, they are clearly far less than Healy's calculated estimates. In addition, there is a fair degree of scatter in the data (possibly as a result of the fact that temperature differences do not appear to have been accounted for).

More recently, CARB estimated the statewide extent of "excess emissions"—defined as the difference between emissions at a given ORVR penetration and baseline emissions (0% ORVR).[26] CARB assumed that 35% of California's gasoline is dispensed by Gilbarco VRS and 20% is dispensed by Wayne Vac VRS, and that the test data from the Gilbarco and Wayne Vac VRS were representative of all Gilbarco and Wayne Vac systems in the field (although no measurements of A/L appear to have been made on the VRS that were tested). For the South Coast Air Basin ozone attainment date of 2010, CARB estimated that excess emissions would be 4.34 tons/summer day from the Gilbarco VRS and 1.98 tons/summer day from the Wayne VRS (totaling 6.32 tons per summer day), based upon total gasoline sales of 43.4 million gallons/day.[27]

Although it is not possible to adjust CARB's data for the biases associated with the VRS modifications made to simulate ORVR and the lack of emissions data at the nozzle/fill pipe interface, two errors appear to have been made that can be corrected. First, CARB used the data for the Wayne Vac VRS when the P/V valve was removed, rather than when it was present. As shown in Figure 3-4, the effects of ORVR vehicles were much lower when the P/V valve was in place: i.e., excess emissions at 100% ORVR were only 0.0925 lb/1000 gal, as opposed to the 0.688 lb/1000 gal when the P/V valve was removed. Secondly, CARB did not correct these data for the fact that the gasoline RVP has decreased from 7.8 psi to 7.0 psi (corresponding to a decrease in uncontrolled emissions from 8.4 lb/1000 gal to 7.6 lb/1000 gal).[28] Making these adjustments results in the following corrected data:

Revised excess emissions from Gilbarco systems

$$= (4.34 \text{ tons/summer day}) * \frac{7.6}{8.4} = 3.93 \text{ tons/summer day}$$

Revised excess emissions from Wayne systems

$$= (1.98 \text{ tons/summer day}) * \frac{0.0925}{0.688} * \frac{7.6}{8.4} = 0.24 \text{ tons/summer day}$$

resulting in total excess emissions of 4.17 tons/summer day, 34% less than CARB's estimate of 6.32 tons/summer day.

Since the time of CARB's report, modifications to Gilbarco's VRS have become available which allow A/L to be reduced: i.e., by adding a "mini-boot" to the nozzle, the range of allowable A/L

[26]CARB, "Enhanced Vapor Recovery: Initial Statement of Reasons for Proposed Amendments to the Vapor Recovery Certification and Test Procedures for Gasoline Loading and Motor Vehicle Gasoline Refueling at Service Stations," February 4, 2000.

[27]Future gasoline throughput was calculated from CARB's formulas: i.e., 1997 gasoline sales data of 13,481,725,000 gal/yr, divided by (365 days/yr) and multiplied by a growth factor (for 1997 to 2010) of 1.176.

[28]CARB, "DRAFT – Uncontrolled Vapor Emission Factor at Gasoline Dispensing Facilities," January 5, 2000.

becomes 0.9 to 1.1. CARB has calculated that this reduction in A/L (from the original allowable range of 1.0 to 1.2) reduces excess emissions by 50%.[29]

3.2.2 Tech Environmental Calculations of CARB's "Excess Emissions"

Tech Environmental's calculations are based upon CARB's draft test report data on VRS with the P/V valve intact, adjusted for volatility. Specifically, CARB's recent report shows that if 100% of vehicles were equipped with ORVR, the excess emissions from the Gilbarco VRS would be 0.860 lb/1000 gal. As shown in Figure 3-4 and mentioned above, excess emissions from the Wayne Vac VRS would be 0.0925 lb/1000 gal. Tech Environmental has multiplied both of these emission factors by the fraction

$$\frac{\text{(Uncontrolled Displacement Emissions Calculated by MOBILE6 Algorithms)}}{\text{(8.4 lb/1000 gal)}}$$

to adjust for volatility.

Calculations of excess emissions at 100% ORVR penetration in units of grams per gallon were calculated by weighting the emissions from each system by the fraction of GDFs equipped with that system, multiplying by 1000/(453.6 g/lb), and multiplying by (1 – the percentage of vehicles with mechanical seal fill pipes). For the purposes of this report, a conservative assumption was made that 0% of vehicles are equipped with mechanical seal fill pipes.

Excess emissions are assumed to only be an issue for functioning Stage II systems. As discussed in Section 3.1.2, the fact that in-use Stage II efficiencies are less than 95% is an indication that in many cases they are either not present or not functioning properly. Technically, this could be a result of A/L either being too high or low; however, the assumption was made that

$$\text{\% of GDFs with functioning Stage II systems} = \frac{\text{Stage II in-use efficiency}}{0.95} \qquad (3\text{-}3)$$

which is equivalent to assuming that Stage II systems fall into two categories: fully functional (95% effective) and non-functional (0% effective).

For each vehicle age and each vehicle type, excess emissions factors (g/gal) were calculated using the following formula:

$$\begin{aligned}\text{Excess emissions factor} = \; & \text{(Excess emissions factor at 100\% ORVR)*} \\ & \text{(\% of vehicles equipped with ORVR)*} \\ & \text{(\% of GDFs with functioning Stage II vac assist systems)}\end{aligned} \qquad (3\text{-}4)$$

[29]CARB spreadsheet "tosco em red 120501," provided by Bill Bunch (The Phillips 66 Company), June 20, 2002. This estimate is based upon the assumption that average pressures in the underground storage tanks decrease from 2.0" w.c. to 0.5" w.c. as a result of the A/L reduction, and fugitive emissions from those tanks are proportional to the square root of the average pressures.

It was also recognized that "excess emissions" for CARB were defined as those above typical controlled emissions from Stage II systems, not those above typical controlled emissions from ORVR. Given that MOBILE6 calculates that ORVR is more effective than Stage II at controlling displacement emissions (98% vs. 95%), another factor was also added to account for the differences in baseline:

$$\text{Adjustment factor} = (\text{Uncontrolled emissions})*(0.98-0.95)*(\%\text{ of vehicles equipped with ORVR})*(\%\text{ of GDFs with functioning Stage II vac assist systems}) \quad (3\text{-}5)$$

For purposes of discussion in this study, "excess emissions" refer to the sum of the factors calculated in equations (3-4) and (3-5): i.e., all emissions above what would be predicted by MOBILE6.

Excess emissions data for different vehicle ages and types were combined as described in Section 3.1.4.

3.2.3 API-Sponsored Study of "Excess Emissions"

API-sponsored tests of "excess emissions" were conducted in October and November 2002 and July and October 2003.[30] The first set of tests was conducted at an actual GDF dispensing gasoline and the second set of tests was conducted in a Sealed Housing for Evaporative Determinations (SHED).

These tests demonstrated that for a standard vapor recovery nozzle (A/L = 1.15) on a Gilbarco VRS, the vapor growth process in the UST for individual refueling events generates "excess emissions" of pressure-related fugitives of 0.72 lb/1,000 gallons, slightly less than the level CARB assumes (0.86 lb/1,000 gallons). The study also shows the total incompatibility emissions for the standard nozzle (A/L = 1.15) are only 0.42 lb/1,000 gallons, about half of what CARB presumes for all ORVR vehicles (0.86 lb/1,000 gallons). When the fugitive emissions from ORVR vehicles refueled with a mini-boot nozzle (A/L = 0.95) were measured on a Gilbarco VRS, there were no ORVR incompatibility and measured "excess emissions" were zero.

3.3 Gasoline Throughputs

Tech Environmental utilized gasoline sales data for a calendar year in which VMT data were also available as a baseline. For future years, these data were scaled up by VMT, accounting for increases in the fraction of VMT traveled by alternatively-fueled vehicles (Z): i.e.,

$$\text{Future yr. gasoline sales} = \text{Baseline yr. gasoline sales} * \frac{(\text{Future Yr. VMT})*(1-Z)}{(\text{Baseline Yr. VMT})} \quad (3\text{-}6)$$

[30] Tech Environmental, Inc., "ORVR Compatibility Study for the Gilbarco VAPORVAC VRS", February 2004, prepared for the American Petroleum Institute.

3.4 Summary of Calculation Methodology

Tech Environmental, Inc. has utilized a spreadsheet incorporating MOBILE6 algorithms, CARB test data, and API test data for excess emissions to calculate refueling emissions.

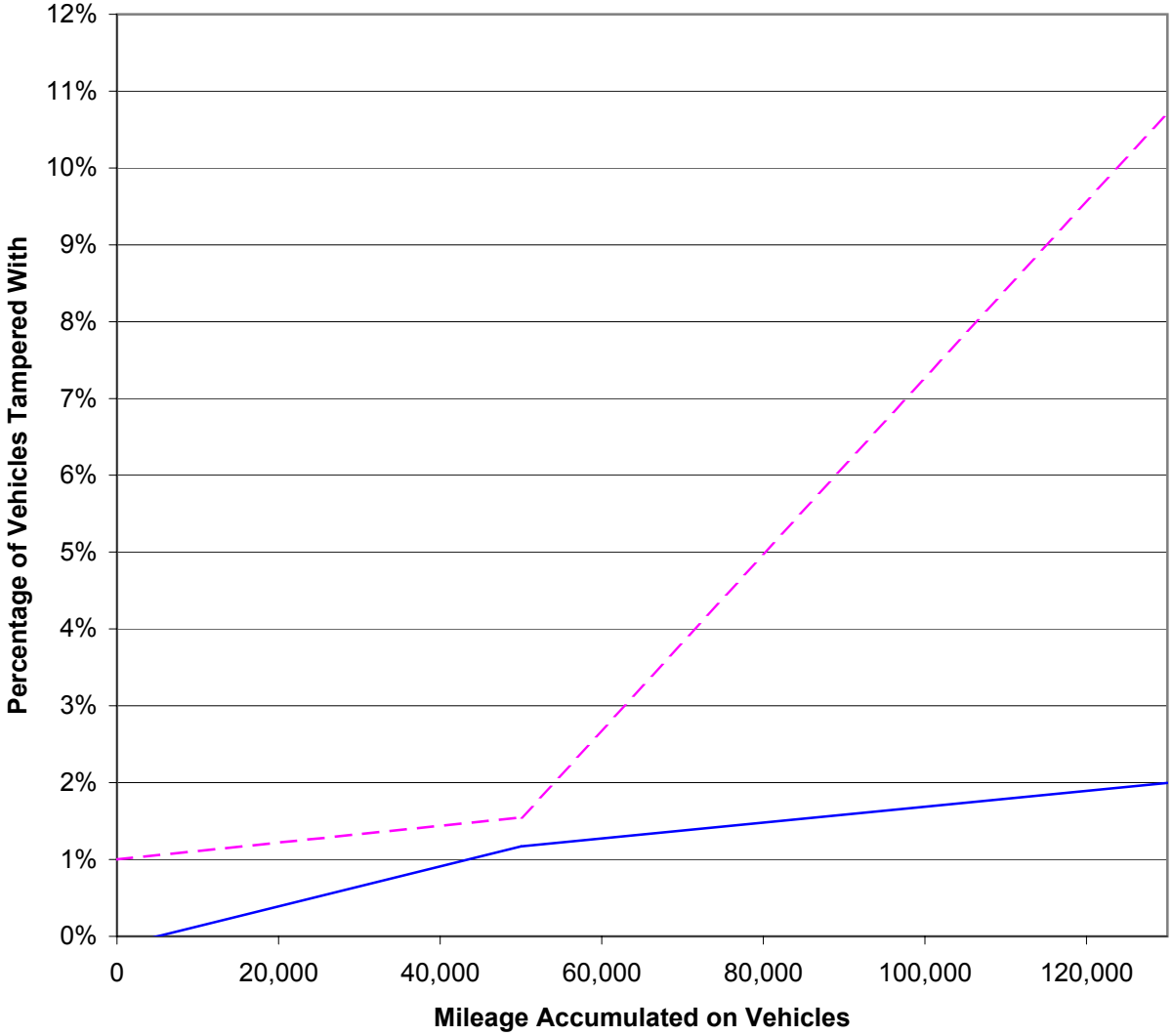
The MOBILE6 algorithms have been validated against the MOBILE6 model, and it has been shown that MOBILE6 currently still incorporates effects of canister tampering for most vehicle ages, despite the fact that EPA has stated that canisters in model year 1996 and later vehicles are not tampered with to any significant extent. Tech Environmental has only incorporated effects of canister tampering for model validation against MOBILE6; tampering effects have been removed for the calculations described in Section 4.

Although there are believed to be several biases in CARB's test methodology that overstate excess emissions, Tech Environmental has used CARB's data for vacuum assist VRS with P/V valves installed, and adjusted only for lower gasoline volatilities, as described in Section 3.2.1. Tech Environmental has also considered more recent API-sponsored test data for excess emissions, excess emissions for total incompatibility emissions, and excess emissions when using a miniboot nozzle.

TABLE 3-1. COMPARISON OF COMPOSITE DATA.

	Avg. Emissions, g/mi		Avg. Fuel Economy, mpg		Avg. Emissions, g/gal	
	MOBILE6	TE spreadsheet	MOBILE6	TE spreadsheet	MOBILE6	TE spreadsheet
Year 2007						
LDGV	0.0198	0.0198	23.89	23.89	0.473	0.473
LDGT1-2	0.0290	0.0290	20.20	20.20	0.586	0.586
LDGT3-4	0.0554	0.0554	14.40	14.40	0.798	0.797
HDGV2B	0.0826	0.0830	10.04	10.03	0.829	0.833
Other HDGV					1.091-1.093	1.092
Year 2028						
LDGV	0.0096	0.0096	23.90	23.90	0.229	0.229
LDGT1-2	0.0129	0.0129	20.20	20.20	0.261	0.261
LDGT3-4	0.0191	0.0191	14.40	14.40	0.275	0.275
HDGV2B	0.0272	0.0272	10.13	10.13	0.276	0.275
Other HDGV					1.092	1.092

FIGURE 3-1. EPA BASE TAMPERING RATES FOR EVAPORATIVE EMISSIONS CANISTERS, MODEL YEAR 1984 AND LATER VEHICLES.



Light-Duty Ground Vehicles

Light-Duty Trucks and All Other Vehicles

Tampering rates are assumed to be constant (slope = 0) if milage > 130,000.

Final tampering rates may be reduced from base tampering rates if anti-tampering programs are in place.

FIGURE 3-2. MODEL VALIDATION FOR CALENDAR YEAR 2007.
(ORVR, Stage II Efficiency 76%, No Incompatibility, No ATP)

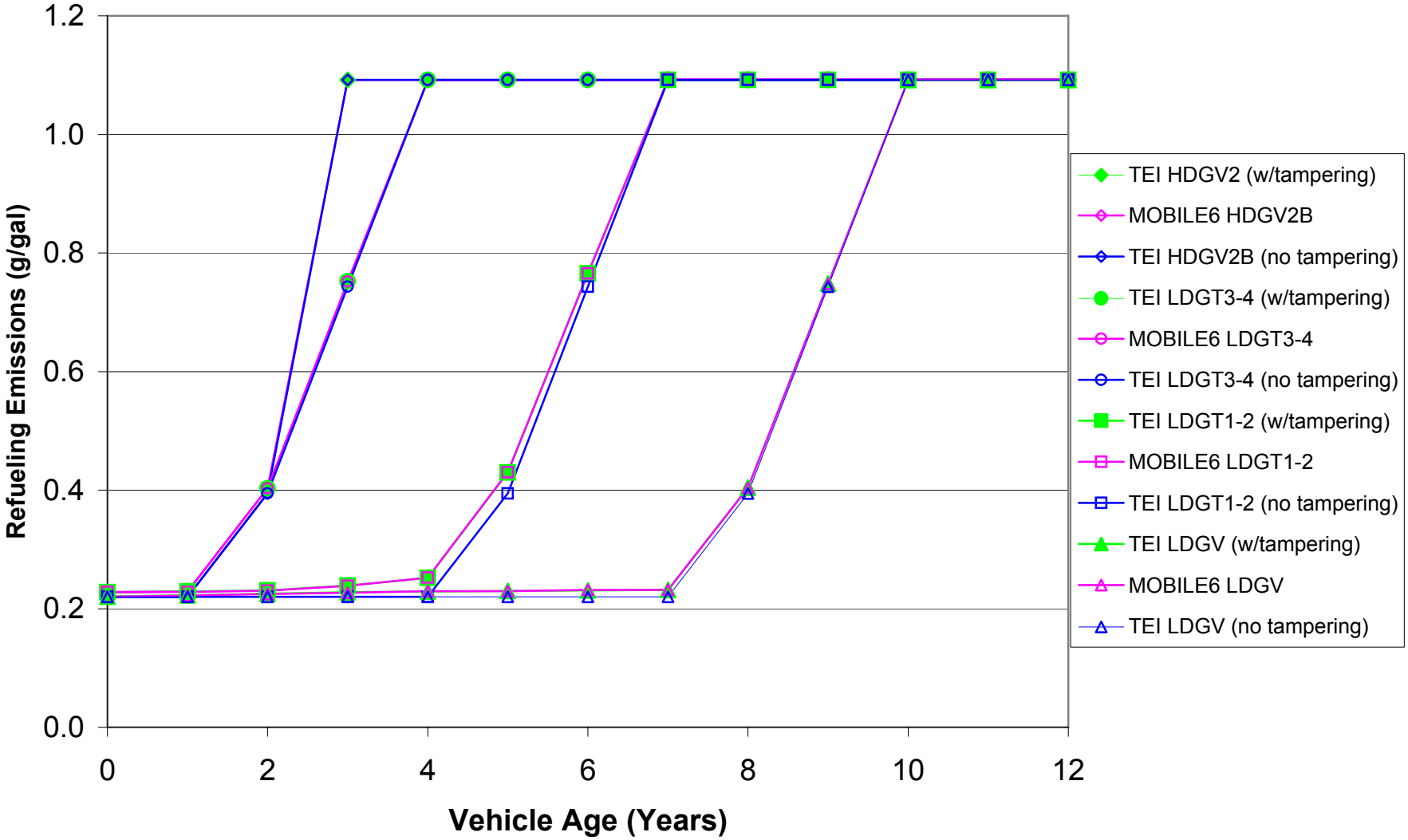


FIGURE 3-3. MODEL VALIDATION FOR CALENDAR YEAR 2028.
(ORVR, Stage II Efficiency 76%, No Incompatibility, No ATP)

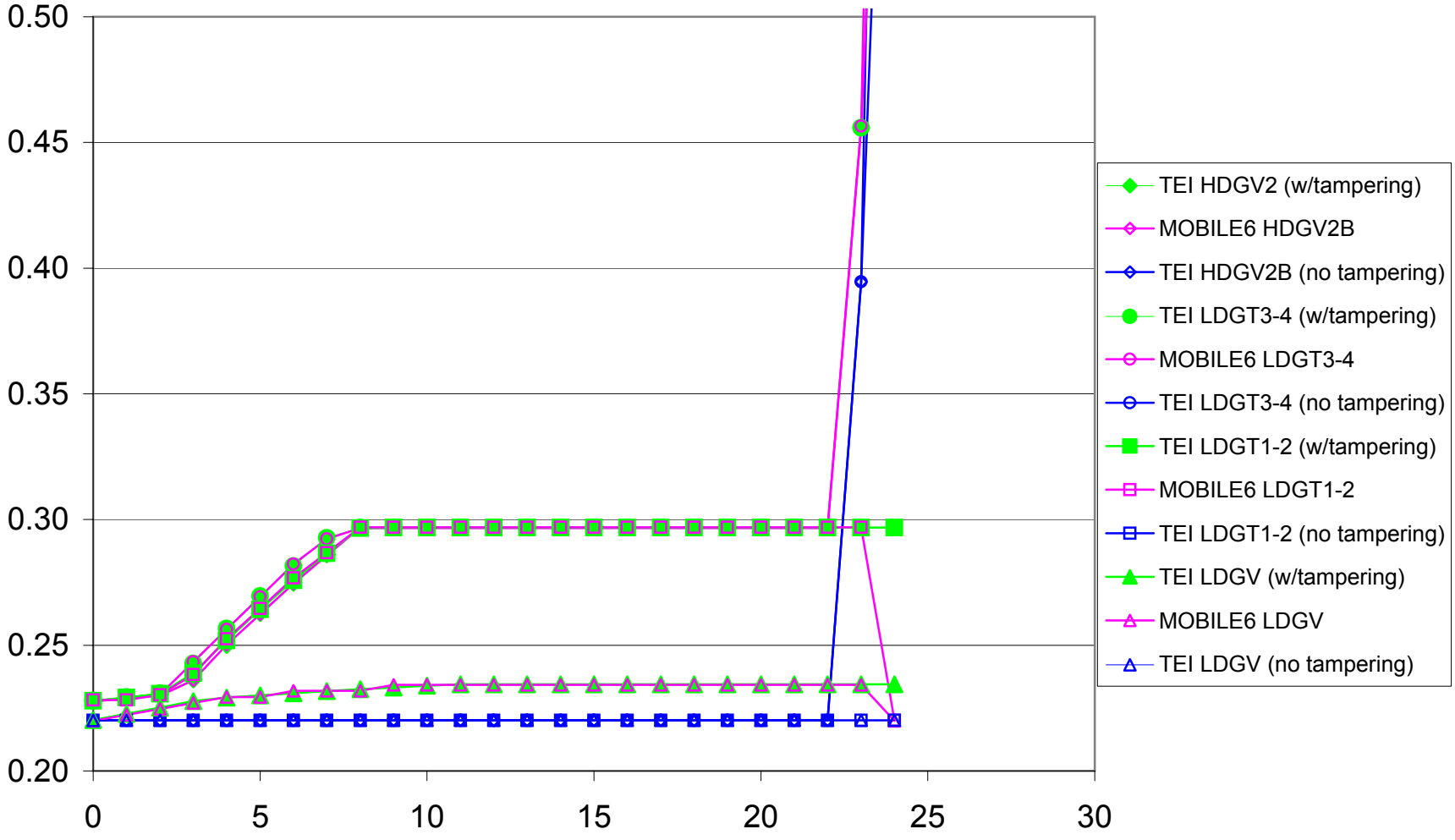
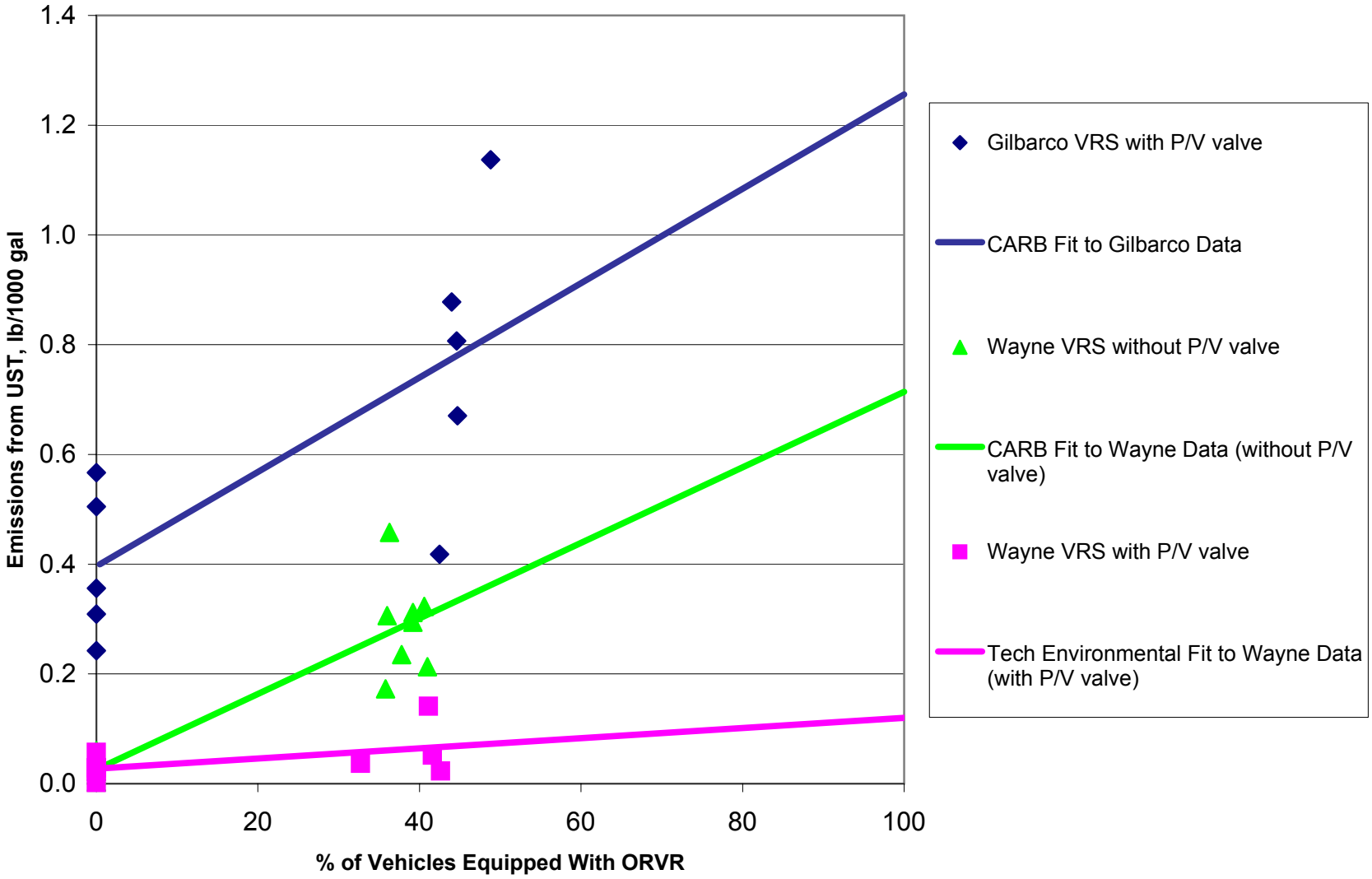


FIGURE 3-4. PLOT OF CARB TEST DATA AS A FUNCTION OF THE PERCENTAGE OF ORVR VEHICLES (GASOLINE RVP = 7.8 PSI).



4.0 REFUELING EMISSIONS CALCULATIONS FOR FLORIDA

Emissions calculations for Florida demonstrate that "excess emissions" are negligible relative to total VOC emissions. Inputs to the calculational methodology are described in Section 4.1, results are shown in Section 4.2, and conclusions are identified in Section 4.3.

4.1 Input Data to Calculation Methodology

As described in Section 3 and the following subsections, there are several pieces of data that the modeling methodology requires as inputs. Input data for gasoline RVP, ambient temperatures, Stage II in-use efficiencies and percentages of Gilbarco and Wayne Vac equipment are summarized in Table 4-1. For the calculation of refueling emissions discussed in this section, it is assumed that none of the Gilbarco systems are equipped with the "mini-boot" that reduces excess emissions by 50% (as discussed in Section 3.2.1), unless explicitly stated.

It should be noted that these estimates are only appropriate for summertime emissions calculations (i.e., tons per summer day). Because of the dependence of refueling emissions on temperature, annual emissions calculations should be conducted with temperatures more representative of annual temperatures. Annual VOC emissions are significantly overestimated if they are calculated by multiplying summer day emissions by 365.

4.1.1 Vehicle Miles Traveled (VMT)

Projections of total VMT for Palm Beach, Broward, and Dade counties are shown in Figure 4-1.

For each county, the VMT mix (distribution of VMT among different vehicle types) were obtained from recent conformity reports prepared by that county's Metropolitan Planning Organization[31,32,33]. The VMT mix was given for 2005, 2015, 2025, and 2030 for Palm Beach and Dade counties. The VMT mix was given for 2005, 2015, and 2025 for Broward county. The VMT mix was assumed to be constant for the other years surrounding the given year. (So the 2005 VMT mix was assumed to be constant for 2001-2010, the 2015 VMT mix was assumed to be constant for 2011-2020 etc.) VMT mix information was provided in terms of MOBILE5 vehicle types, and the data were converted to MOBILE6 vehicle types as discussed in Section 3.1.4. Diesel sales fractions for each of the MOBILE6 vehicle types were obtained from MOBILE6 default diesel sales fractions.

The total VMT data was given for 2005, 2015, 2025, and 2030 for Palm Beach and Dade counties. The total VMT data was given for 2005, 2015, and 2025 for Broward county. Total VMT data were extended to 2001-2030 to predict VMT for other years, as shown in Figure 4-1.

---

[31]Clean Air Act Amendments of 1990 Conformity Determination Report for the Palm Beach 2030 Long Range Transportation Plan, March 2005.
[32]Broward County Metropolitan Planning Organization Year 2025 Long Range Transportation Plan Conformity Determination Report (CDR), UPWP Tasks #3.01 and #3.09, September 2002.
[33]Miami-Dade Transportation Plan Update to the Year 2030 Air Quality Conformity Determination, December 2004.

For all three counties, Tech Environmental used predictions from the U.S. Department of Energy (DOE) Energy Information Administration's (EIA) annual report[34] to estimate the fraction of vehicle miles traveled by zero-emissions vehicles/alternatively-fueled vehicles[35] (Z). This report included national estimates of Z for light-duty vehicles out to 2025; Tech Environmental extrapolated these data to 2030 and assumed that they also applied to heavy-duty vehicles.

4.1.2 Vehicle Registration Data/Age Distributions

The MOBILE5 default vehicle age distribution data were used in the agencies' MOBILE emissions runs for determining exhaust emissions from vehicles in the Florida SIP and Transportation Conformity Plans. The Florida Department of Transportation (FDOT) was contacted in an attempt to obtain Florida-specific vehicle age distribution data, but this information is not tracked in a useful format and was not available[36] and so this study also used the default MOBILE5 data, which are the most recent data available. Since Florida did the MOBILE runs, the latest model version is MOBILE6, so Florida's MOBILE5 vehicle age distribution data were converted to MOBILE6 vehicle age distribution data as discussed in Section 3.1.4.

4.1.3 Gasoline Usage

Gasoline sales data are not collected in Florida on a per-county basis and so these data were not available from FDEP, FDOT or other sources. The US DOT tracks gasoline sales data on a statewide basis. According to US DOT data, in Florida 8,029 million gallons of gasoline were used to travel 185,510 million miles in 2003,[37] an average of 23.1 mi/gal; this average fuel economy was used to determine gasoline usage in the three counties based upon the VMT in those areas.

4.1.4 Stage II In-Use Efficiency

Florida is assuming a Stage II in-use efficiency of 70%. This is based upon a control efficiency of 95%, rule effectiveness of 80%, and rule penetration of 92%.[2]

4.2 Results of Refueling Emissions Calculations

Figures 4-2 through 4-4 illustrate the results of refueling emissions calculations for 2001-2030 for Palm Beach, Broward, and Dade counties, compared to the calculations in the Florida SIP.[2] The SIP is predicting Stage II emissions in 2015 will be 0.97 tons per summer day (tpsd) in Palm Beach county, 1.57 tpsd in Broward county, and 1.93 tpsd in Dade county. This report is predicting that refueling emissions from ORVR alone would be below these values by 2012, 2011, and 2014 in Palm Beach county, Broward county, and Dade county, respectively. With

[34]This report, "Annual Energy Outlook 2005 with Projections to 2025" (Report# DOE/EIA-0383(2005), released January 2005), can be found at http://www.eia.doe.gov/oiaf/aeo/index.html.
[35]Alternatively-fueled vehicles include hybrids, fuel cells, CNG, LPG, and ethanol/methanol vehicles.
[36]Akhtar Nabeel (FDOT), to Dana Buske (Tech Environmental), June 8, 2005.
[37]US DOT (FHWA), Highway Statistics 2003, October 2004, http://www.fhwa.dot.gov/ohim/hs03/index.htm, Tables MF-2 and VM-3M.

ORVR and Stage II, including "excess emissions", this report is predicting that refueling emissions would be below these SIP values by 2006, 2004, and 2007 in Palm Beach county, Broward county, and Dade county, respectively.

Of the refueling emissions, "excess emissions" increase over time as a higher percentage of in-use vehicles become equipped with ORVR. By 2007, "excess emissions" as defined by CARB are 0.17 tpsd in Palm Beach, 0.21 tpsd in Broward, and 0.29 tpsd in Dade. As discussed in Section 4.1, these are conservative, given that it is assumed that none of the Gilbarco systems are fitted with the "mini-boot." In Palm Beach, emissions with only ORVR requirements in place (i.e., Stage II requirements removed) are lower than those with Stage II and ORVR by the year 2015; this "crossover" occurs by 2016 in Broward and 2017 in Dade county.

Using data obtained from a refueling study commissioned by the American Petroleum Institute (API), in 2007 the "excess emissions" (i.e., Marconi/Gilbarco VRS with A/L of 1.15) will only be 0.15 tons/summer day (tpsd) in Palm Beach county, 0.19 tpsd in Broward county, and 0.26 tpsd in Dade county.

If total incompatibility emissions (including fillpipe emission reductions from ORVR) from the API study are assumed, then in 2007 the "excess emissions" (i.e., Marconi/Gilbarco VRS with A/L of 1.15, taking into account the fillpipe emission reductions with ORVR) will only be 0.12 tons/summer day (tpsd) in Palm Beach county, 0.14 tpsd in Broward county, and 0.20 tpsd in Dade county.

CARB has estimated that 50% of these excess emissions can be eliminated by installing a simple "mini-boot" modification offered by the vendor. API refueling test results show that "excess emissions" from the Marconi/Gilbarco VaporVac Stage II VRS can be totally eliminated with a "mini-boot" (100% reduction). There would still be some small "excess emissions" from the Wayne Vac system. Thus, in 2007, "excess emissions" (i.e., Marconi/Gilbarco VRS with A/L of <1, mini-booted system) would only be 0.07 tons/summer day (tpsd) in Palm Beach county, 0.08 tpsd in Broward county, and 0.11 tpsd in Dade county.

EPA is considering four definitions of "widespread use," as defined in Section 1, and has not yet decided on which definition to use or an appropriate percent implementation. For comparison, Florida is assuming that Stage II in-use efficiency is 70%.[2] The ORVR requirements alone are as effective as the Stage II requirements alone by 2007 in Palm Beach, 2008 in Broward and 2009 in Dade, as shown in Figures 4-2, 4-3, and 4-4 (see Point A).

Figure 4-5 shows that 70% of the gasoline dispensed by GDFs will be dispensed to ORVR-equipped vehicles by 2008 in Palm Beach county, by 2009 in Broward county, and by 2010 in Dade county; 80% will be dispensed to ORVR-equipped vehicles by 2010 in Palm Beach county, by 2011 in Broward county, and by 2013 in Dade county; and 90% will be dispensed by 2014 in Palm Beach county, by 2016 in Broward county, and by 2017 in Dade county.

Figure 4-6 illustrates that 70% of the VMT will be by ORVR-equipped vehicles by 2008 in Palm Beach county, by 2008 in Broward county, and by 2009 in Dade county; 80% will be by ORVR-equipped vehicles by 2010 in Palm Beach county, by 2010 in Broward county, and by 2012 in

Dade county; and 90% will be by ORVR-equipped vehicles by 2013 in Palm Beach county, by 2014 in Broward county, and by 2016 in Dade county.

4.3 Conclusions

Total refueling emissions in Palm Beach county start out at 1.2 tpsd in 2001 and decrease to 0.9 tpsd by 2007; emissions in Broward county start at 1.8 tpsd in 2001 and decrease to 1.2 tpsd by 2007; emissions in Dade county start at 2.7 tpsd in 2001 and decrease to 1.9 tpsd by 2007. Clearly, these emissions as a whole are insignificant in comparison to the emissions inventories in Figure 2-2.

"Excess emissions" from ORVR incompatibility—which are estimated conservatively, using CARB's test data (which are known to be biased conservatively, as described in Section 3.2.1) and the assumption that none of the Gilbarco-equipped VRS are equipped with a "mini-boot" for reducing "excess emissions"—amount to only 0.17 tpsd in Palm Beach county, 0.21 tpsd in Broward county, and 0.29 tpsd in Dade county by 2007. Total emissions from refueling continue to decline for several years after 2007. "Excess emissions" as calculated from more recent API test data are even lower.

Therefore, the overall conclusion is that the purported "incompatibility" of ORVR and vacuum-assisted Stage II equipment does not lead to unacceptable emissions increases and ORVR should be considered to be "in widespread use" by 2007-2014 in Palm Beach county, 2008-2016 in Broward county, and 2009-2017 in Dade county, depending upon how this term is defined by EPA.

TABLE 4-1. MODEL INPUT DATA.

	Palm Beach [1]	Broward [2]	Dade [3]
Gasoline volatility	7.8 psi	7.8 psi	7.8 psi
Summertime day temperatures			
Minimum	69.3°F	69.8°F	69.3°F
Maximum	91.2°F	91.3°F	91.2°F
Stage II In-Use Efficiency[4]	70%	70%	70%
% of Stage II Equipment that is Marconi/Gilbarco	44%[5]	37%[6]	29%[7]
% of Stage II Equipment that is WayneVac	39%[7]	32%[6]	24%[7]

[1]Unless noted otherwise, all data are from "Clean Air Act Amendments of 1990 Conformity Determination Report for the Palm Beach 2030 Long Range Transportation Plan", March 2005.

[2]Unless noted otherwise, all data are from "Broward County Metropolitan Planning Organization Year 2025 Long Range Transportation Plan Conformity Determination Report (CDR)", UPWP Tasks #3.01 and #3.09, September 2002.

[3] Unless noted otherwise, all data are from "Miami-Dade Transportation Plan Update to the Year 2030 Air Quality Conformity Determination", December 2004.

[4]Tom Rogers (FDEP), electronic mail to Dana Buske (Tech Environmental), June 7, 2005. Based upon a control efficiency of 95%, rule effectiveness of 80%, and rule penetration of 92%.

[5]Paul Kalamaras (Palm Beach County Department of Health), electronic mail to Dana Buske (Tech Environmental), June 6, 2005.

[6]Alfred Reed (Broward Environmental Protection Department), estimated that the distribution of Stage II technology was similar to the distribution in Palm Beach and Dade counties, so an average of those two areas was estimated for Broward (telephone conversation with Dana Buske (Tech Environmental), June 6, 2005).

[7]Chi-Ruey Chen (Miami-Dade County Environmental Resources Management) electronic mail to Dana Buske (Tech Environmental), June 7, 2005.

FIGURE 4-1. VMT PROJECTIONS OUT TO 2030.

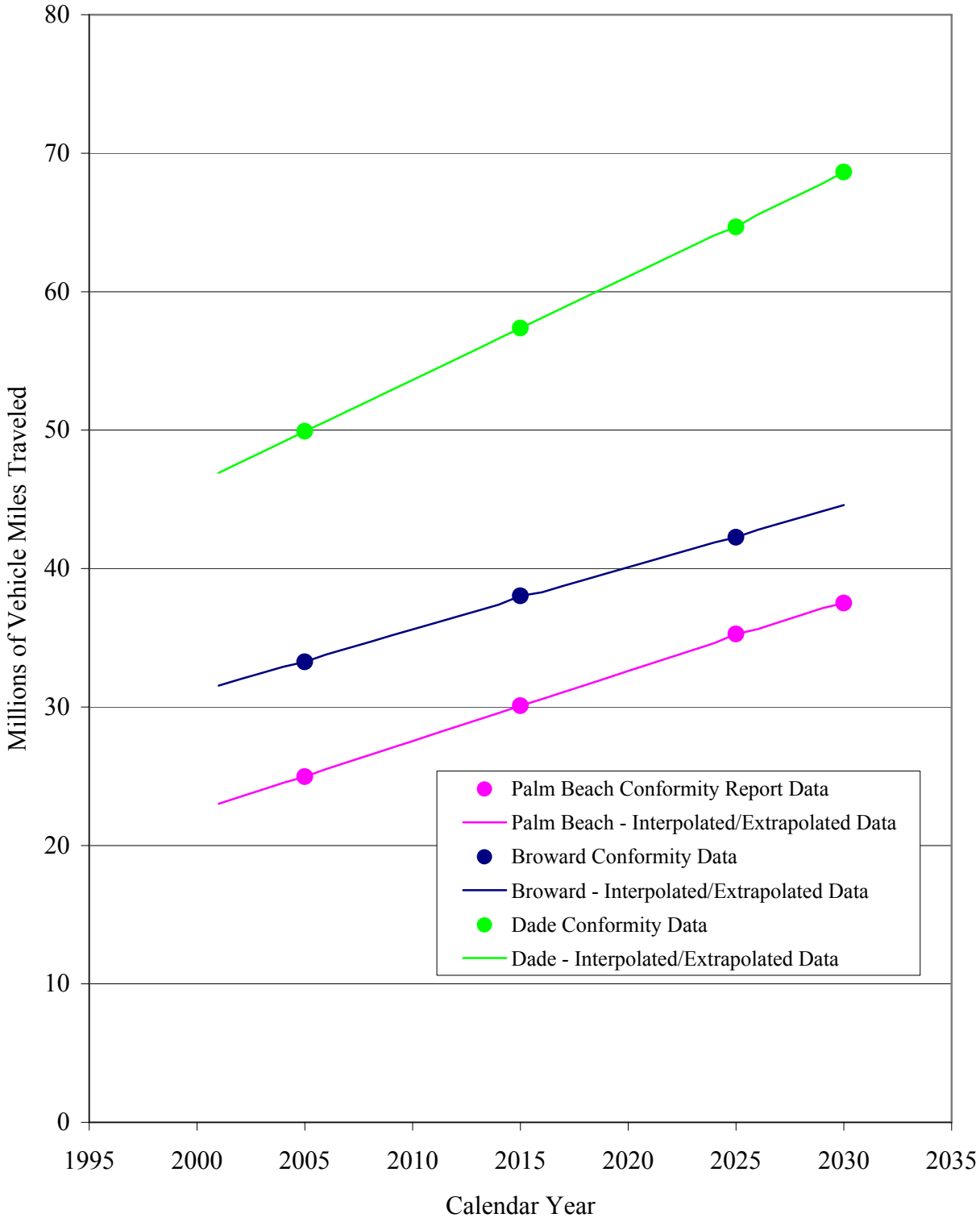


FIGURE 4-2. REFUELING EMISSIONS IN PALM BEACH COUNTY, 2001-2030.

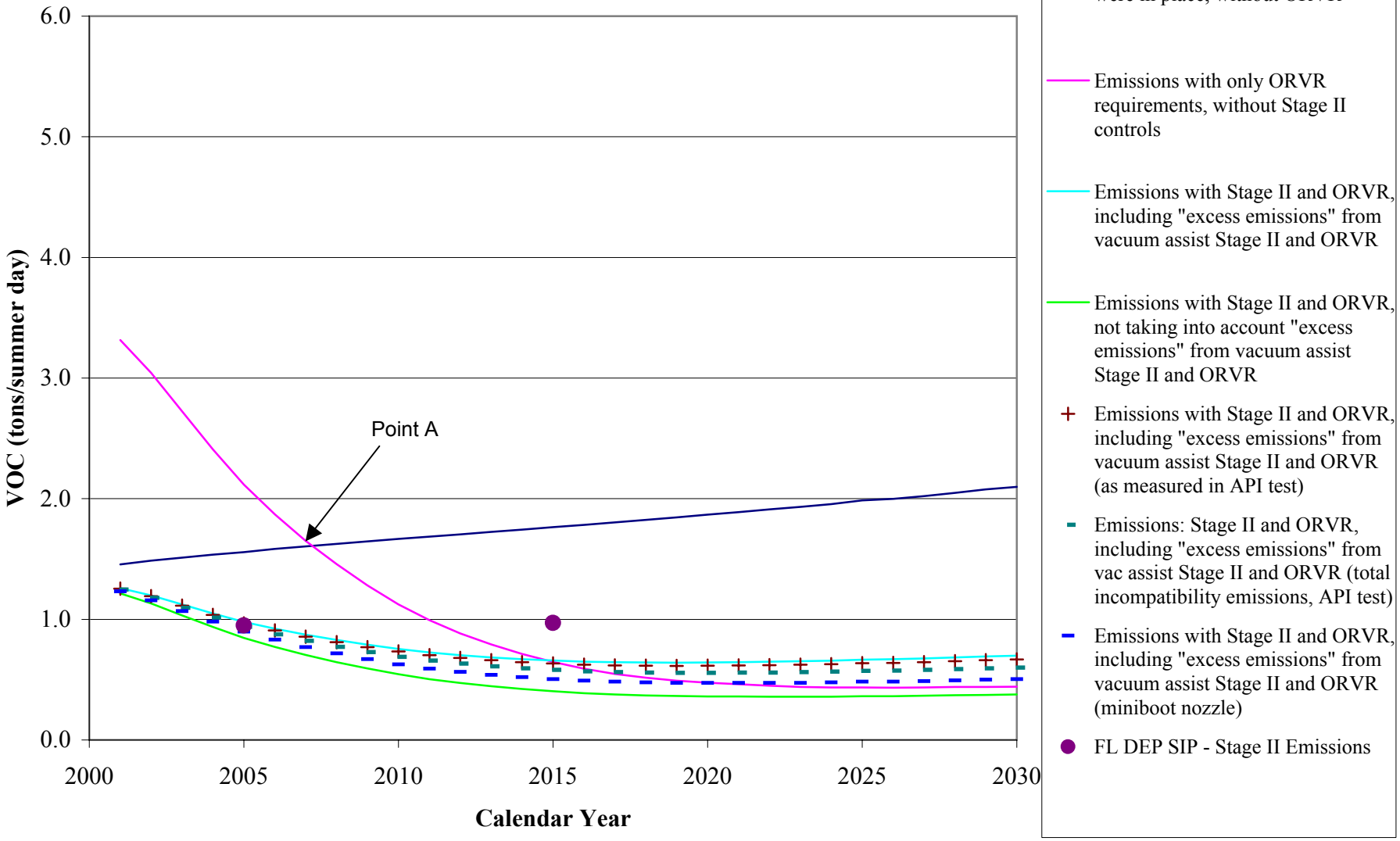


FIGURE 4-3. REFUELING EMISSIONS IN BROWARD COUNTY, 2001-2030.

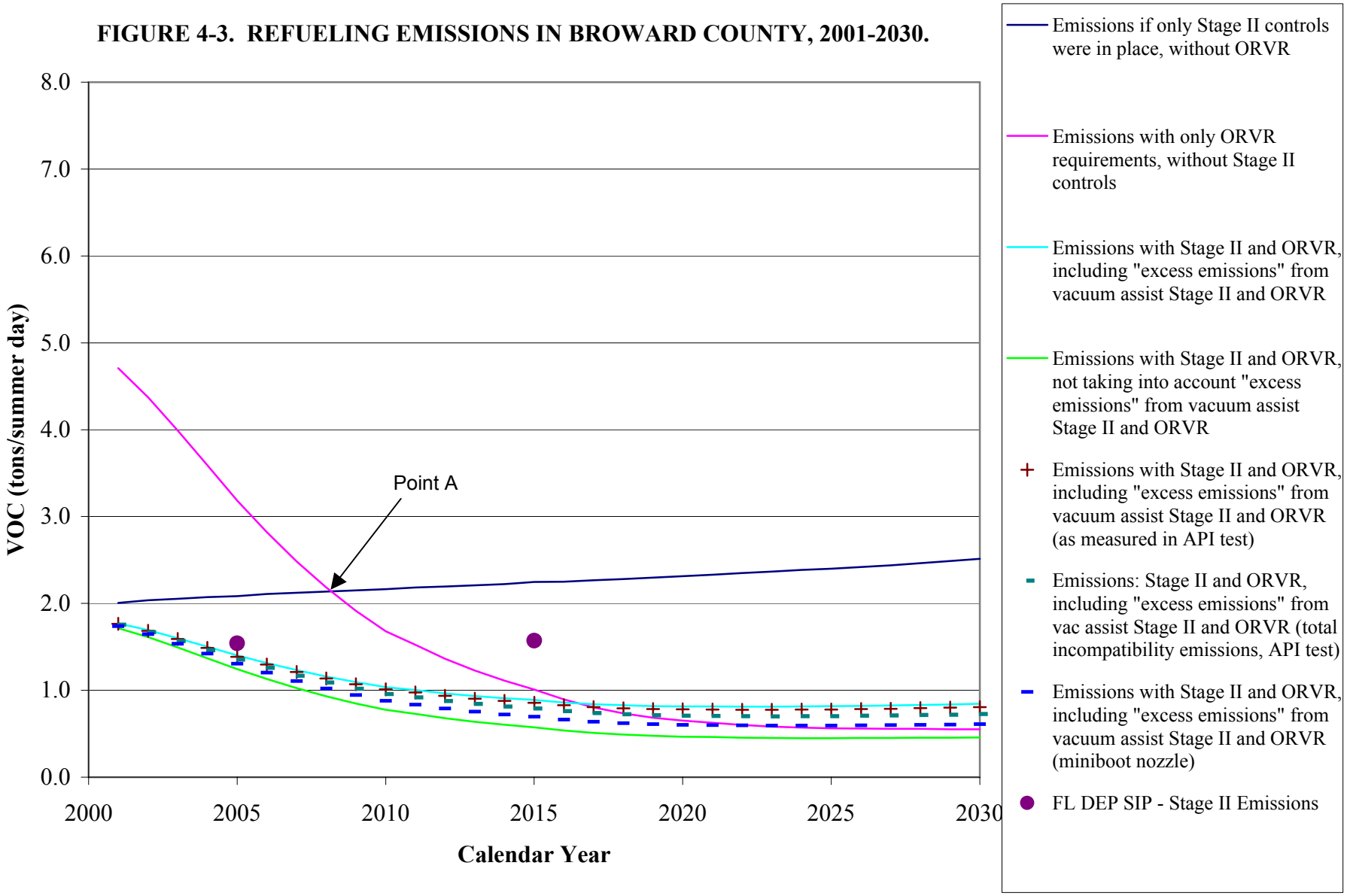


FIGURE 4-4. REFUELING EMISSIONS IN DADE COUNTY, 2001-2030.

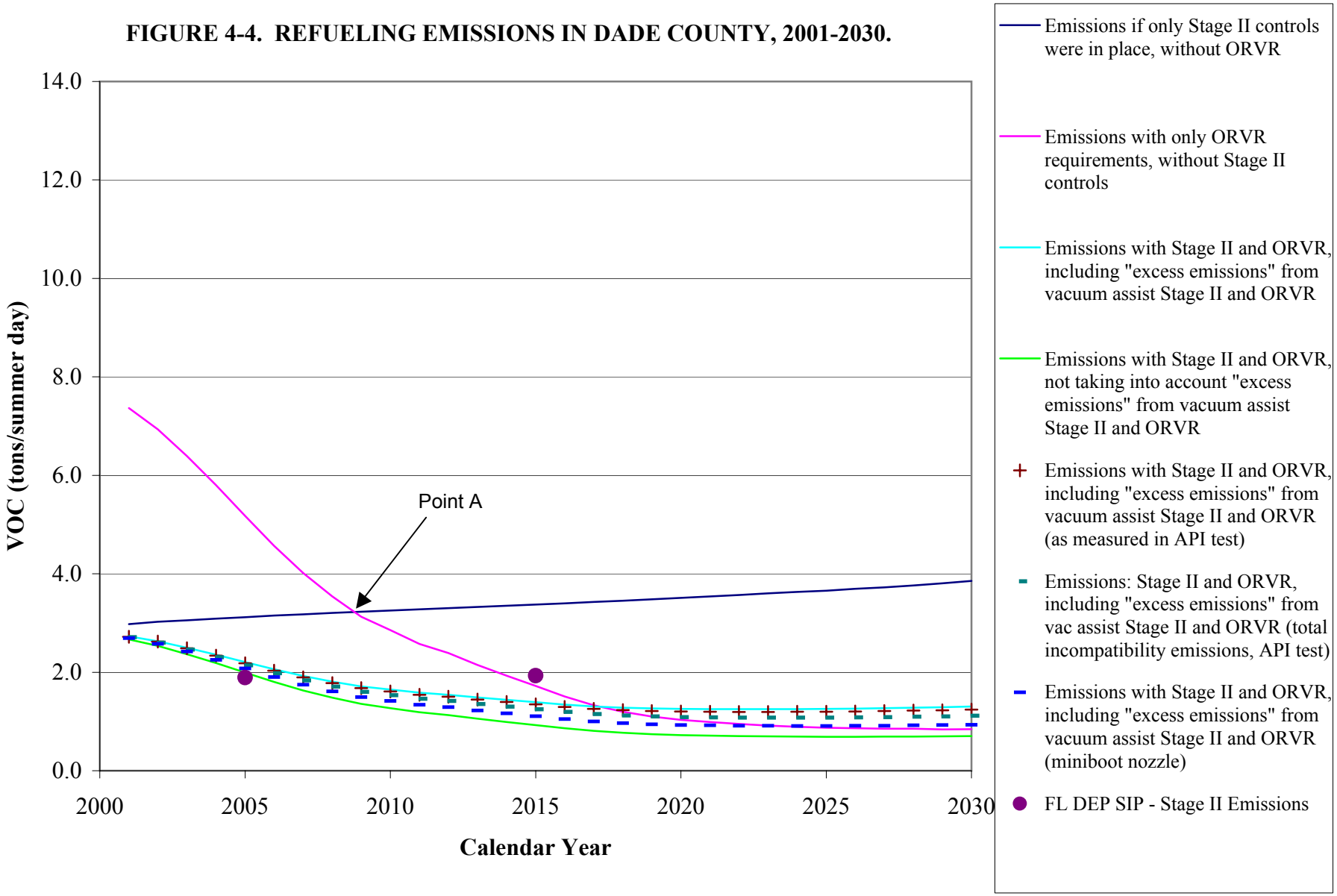
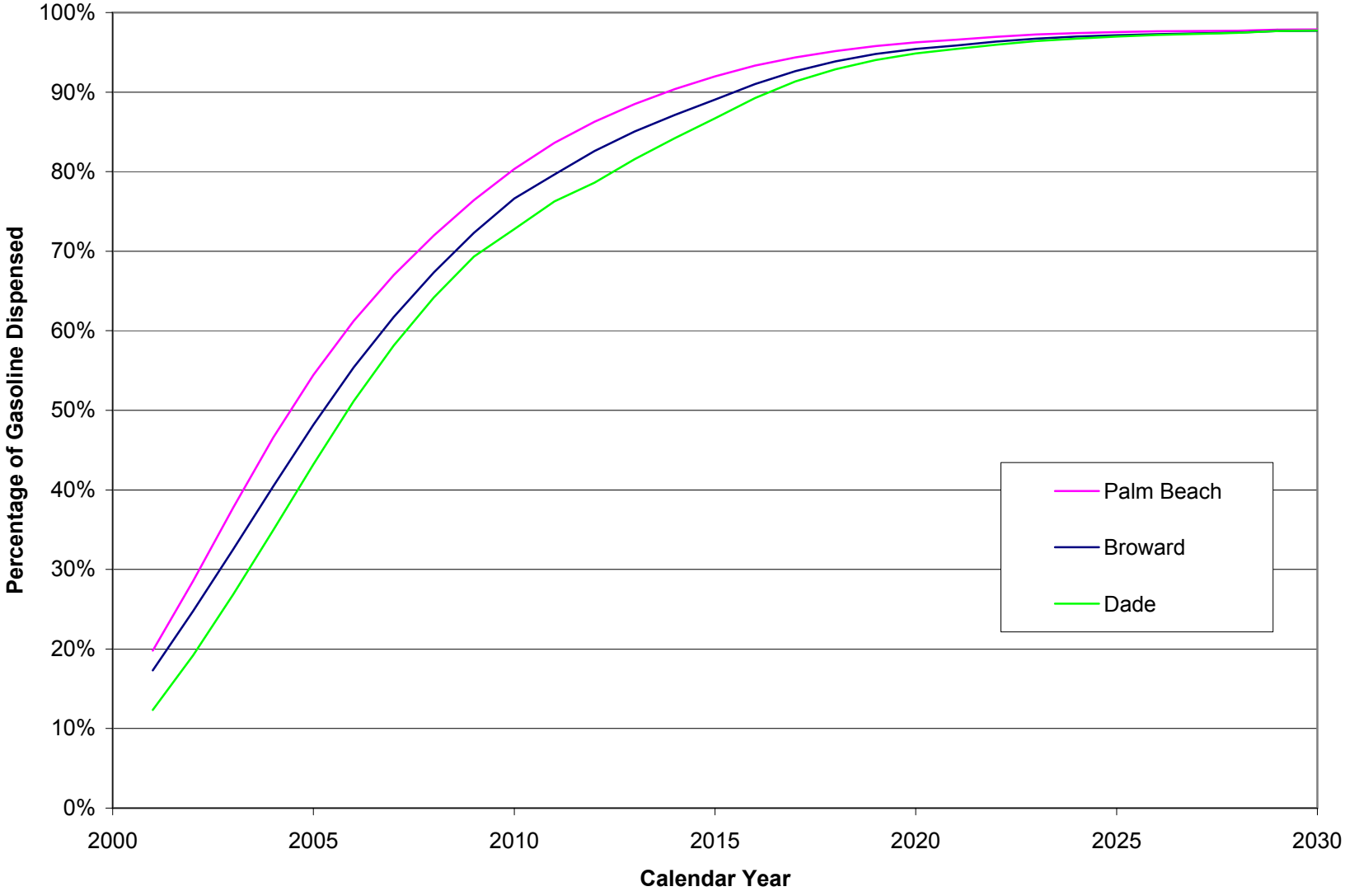
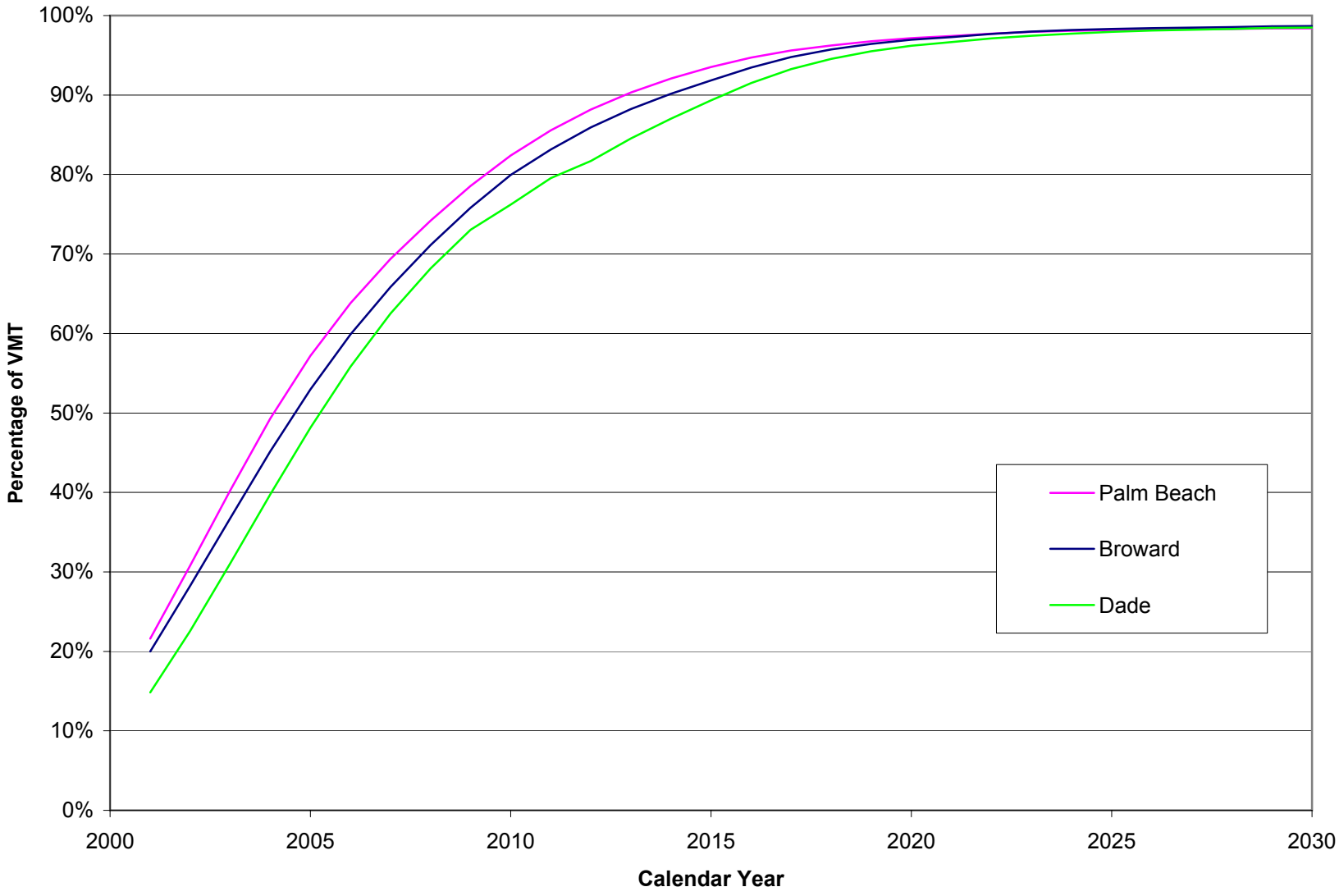


FIGURE 4-5. PERCENTAGE OF GASOLINE DISPENSED TO ORVR-EQUIPPED VEHICLES.



FL report tables and figs.xls, Fig 4-5

FIGURE 4-6. PERCENTAGE OF VMT FROM ORVR-EQUIPPED VEHICLES.



FL report tables and figs.xls, Fig 4-6

5.0 STAGE II COST BENEFIT ANALYSES FOR FLORIDA

Two analyses were conducted, 1) of the costs of maintaining Stage II vapor controls at GDFs and, 2) of retrofitting existing GDF Stage II vapor controls with vapor processors in the tri-county Southeast Florida Airshed, which includes Palm Beach, Broward, and Dade counties.

5.1 VOC Emission Calculations

The emission calculations in these analyses used methodologies and data obtained from different agencies in Florida, as described in previous sections. The analysis of the costs of maintaining Stage II vapor controls at GDFs assumes there would be excess emissions from ORVR incompatibility, as defined by CARB. In the second analysis, the ORVR incompatibility would be eliminated by retrofitting existing GDF Stage II vapor controls with vapor processors.

The analysis of maintaining Stage II demonstrates that actual VOC reductions in the area would be 4.12 tpsd in 2007, shrinking to only 0.44 tpsd by 2015, as shown in Table 5-1. The sharp decline with time in the emission reduction benefit of Stage II is due to increased ORVR penetration in the vehicle population.

5.2 Stage II Maintenance / Vapor Processor Retrofit Costs

The calculation of Stage II implementation costs involved several steps. The number of existing GDFs in the study area where Stage II VRS would have to be maintained were obtained from Dade and Palm Beach counties; this information was not available for Broward and so was estimated based on a comparison of county-wide VMT.[38] There were 1,641 GDFs in the tri-county area in 2005 and a 2% growth in the number of stations between 2005 and 2007 was assumed; maintenance costs were considered for a total of 1,674 GDFs and installation costs were considered for the 2% of new stations. In the second analysis, costs for installing vapor processors were also considered. Based on county-specific data, 92% of the Stage II systems would be a vacuum-assist design, and 8% would be a balance design.

The costs of maintaining Stage II in the tri-county area are the sum of the following cost components, borne by the GDF owner:[39]

1. Annual maintenance costs and other indirect costs offset by gasoline recovery credits.
2. Annual compliance testing costs.
3. Installation of vapor processors on vacuum assist stations, if this option was considered.

Table 5-2 summarizes the costs associated with maintaining Stage II. The most accurate data for capital cost recovery (Item #1 in Table 5-2) are figures published by API[40] in 2002 that

[38] Paul Kalamaras (Palm Beach County Department of Health) and Chi-Ruey Chen (Miami-Dade County Environmental Resources Management), phone and electronic mail to Dana Buske (Tech Environmental), July 11, 2005, respectively.

[39] For a similar analysis, see "Cost Benefit Analysis for Stage II Control in the Knoxville EAC Area", prepared for API by Tech Environmental, April 15, 2004.

document the actual capital equipment, installation and initial performance test costs as $21,735 (retrofit balance system) and $37,040 (retrofit passive vacuum system). Applying a nominal 2% inflation rate from 2002 to 2005 (to bring numbers to 2005 dollars) results in capital costs of $23,065 (balance system) and $39,307 (vacuum system). Annual capital cost recovery used the EPA capital recovery cost equation[41] and an overall cost recovery period of seven years.[42] The resulting annual cost recovery factor is 0.205. The numbers in Item #1 of Table 5-2 are based on the original system retrofits and were used to develop the numbers in the rest of Table 5-2 but are not included in the total cost calculated in Tables 5-2 and 5-3 or in the resulting Figures 5-1 and 5-2.

Any new vacuum assist Stage II equipment installed will cost $32,600 (in 2002 dollars).[40] Applying a nominal 2% inflation rate from 2002 to 2005 (to bring numbers to 2005 dollars) results in a capital cost of $34,595 with a cost recovery factor of 0.205 (Item #2 in Table 5-2).

An analysis of EPA cost data[41] reveals that the maintenance costs (Cost Component 1) can be estimated as 38% of annual capital recovery costs for balance systems and 45% of annual capital recovery costs for vacuum systems (Item #3 in Table 5-2).

Annual compliance testing costs (Cost Component 2) are given in the recent API report[40] as $750 (balance systems) and $1,200 (passive vacuum systems). Adjusted for inflation to 2005 these costs are $796 and $1,273, respectively (Item #4 in Table 5-2).

The annual costs of maintaining Stage II in the tri-county area of Florida are estimated to be $7.3 million per year (Item #5 in Table 5-2). The daily costs are estimated to be $20,005.

Table 5-3 summarizes the costs associated with maintaining Stage II and retrofitting the systems with vapor processors. The maintenance and compliance costs (Item #1 in Table 5-3) were derived as shown in Table 5-2. The installation of a vapor processor on all vacuum-assist Stage II systems (Cost Component 3) was assumed at a cost of $20,000 per station with an annual cost recovery factor of 0.205 (Item #2 in Table 5-3).[43]

The annual costs of maintaining Stage II and installing vapor processors in the tri-county area of Florida are estimated to be $13.6 million per year (Item #3 in Table 5-3). The daily costs are estimated to be $37,303.

The cost-benefit of 1) Stage II VRS maintenance, and 2) Stage II VRS maintenance and Vapor Processor Retrofits in the Southeast Florida tri-county area were calculated by dividing the VOC emission reductions (Table 5-1) by the annual constant-dollar costs (Tables 5-2 and 5-3, respectively), and dividing by 365 days per year. The results are presented in Table 5-4.

---

[40] American Petroleum Institute, "Stage II Vapor Recovery System Operations & System Installation Costs," Publication 1645, Washington, DC, August 2002.

[41] U.S. EPA, "Technical Guidance—Stage II Vapor Recovery Systems for Control of Refueling Emissions at Gasoline Dispensing Facilities," Volume II, Appendix B, EPA-450/3-91-022b, 1991, p. B-25.

[42] The California Air Resources Board uses capital cost recovery periods of 3 to 10 years for various components of a Stage II VRS, with the major direct cost (the dispenser) having a life of seven years. See: California ARB, "Enhanced Vapor Recovery," February 2000, p. 88.

[43] Cost of $20,000 for vapor processor installation (OPW add-on) from Prentiss Searles, API.

5.3 Results of Cost Benefit Analysis

An analysis of the costs of maintaining Stage II vapor controls at GDFs in the tri-county Southeast Florida Airshed, which includes Palm Beach, Broward, and Dade counties, was conducted. The results reveal that VOC reductions in the tri-county area would be 4.12 tpsd in 2007, shrinking to only 0.44 tpsd by 2015 (with incompatibility emissions considered). The total cost of maintaining Stage II is $4,900/ton in 2007, rising steeply to $45,500/ton in 2015.

An analysis of the costs of maintaining Stage II vapor controls at GDFs in the tri-county Southeast Florida Airshed, including vapor processor retrofits to eliminate any "incompatibility emissions" was also conducted, with an implementation cost of $7,800/ton in 2007, rising rapidly to $25,300/ton in 2015.

The implementation of Stage II controls at Southeast Florida gasoline stations would not provide as much VOC reduction benefit in 2007 as in the past because starting in 1998, as mandated by the Clean Air Act, new vehicles sold in the U.S. began to be equipped with Onboard Refueling Vapor Recovery (ORVR) canisters that are more effective at capturing refueling vapors than Stage II systems at gasoline stations. As older vehicles are replaced with newer ones, the percentage of ORVR vehicles on the road will increase. As time goes on, maintaining Stage II controls on gasoline stations will produce less and less benefit (VOC reductions) at a higher and higher cost.

Table 5-1. Summary of VOC Emissions in the Southeast Florida Tri-County Airshed, With and Without Stage II

Year	VOC Emissions Without Stage II (tpsd)	VOC Emissions With Stage II (tpsd)	Reduction Due to Stage II (No Incompatibility)	Reduction Due to Stage II (Incompatibility)
2007	8.15	3.36	4.79	4.12
2008	7.18	3.06	4.12	3.38
2009	6.33	2.80	3.53	2.73
2010	5.58	2.57	3.02	2.16
2011	5.17	2.44	2.72	1.84
2012	4.64	2.28	2.36	1.43
2013	4.17	2.14	2.03	1.06
2014	3.76	2.02	1.74	0.74
2015	3.38	1.91	1.47	0.44

TABLE 5-2. SUMMARY OF ANNUAL STAGE II MAINTENANCE COSTS IN THE SOUTHEAST FLORIDA TRI-COUNTY AIRSHED

Items	Description	Annual Cost
1	Capital Cost Recovery (CCR) as if Stage II not yet installed • Vacuum system at 1540 GDFs (1540)($39,307)(.205) • Balance system at 134 GDFs (134)($23,065)(.205)	 = $12,409,220 = $ 633,596
2	Installing New Stage II Equipment on 2% of Stations • (33)($34,595)(0.205)	=$ 234,035
3	Annual Maintenance and Other Indirect Costs • 38% of CCR for vacuum systems ($12,409,220)(0.38) • 45% of CCR for balance systems ($633,596)(0.45)	 = $4,715,504 = $ 285,118
4	Annual Compliance Testing • $1,273 per test on vacuum systems (1540)($1,273) • $796 per test on balance systems (134)($796)	 = $ 1,960,420 = $ 106,664
5	TOTAL ANNUAL COSTS [1]	= $ 7,301,741
	DAILY COSTS	= $ 20,005

Note: costs are given in constant (2005) dollars. Total costs refer to the tri-county area.

[1] Sum of items 2-4.

TABLE 5-3. SUMMARY OF ANNUAL STAGE II MAINTENANCE COSTS AND VAPOR PROCESSOR RETROFITS IN THE SOUTHEAST FLORIDA TRI-COUNTY AIRSHED

Item	Description	Annual Cost
1	Maintenance and Compliance Costs (See Item 5, Table 5-2)	= $ 7,301,741
2	Vapor Processor Retrofit of Vacuum Systems • Retrofit of 1540 GDFs (1540)($20,000)(0.205)	= $ 6,314,000
3	TOTAL ANNUAL COSTS [1]	=$13,615,741
	DAILY COSTS	= $ 37,303

Note: costs are given in constant (2005) dollars. Total costs refer to the tri-county area.

[1] Sum of items 1 and 2.

Table 5-4. Summary of Cost-Benefit Analysis For Stage II in the Southeast Florida Tri-County Airshed

	Maintaining Stage II	Stage II + Vapor Processor Retrofits
Year	**Costs ($/ton)**	**Costs ($/ton)**
2007	$4,900	$7,800
2008	$5,900	$9,100
2009	$7,300	$10,600
2010	$9,200	$12,400
2011	$10,900	$13,700
2012	$14,000	$15,800
2013	$18,800	$18,400
2014	$27,000	$21,400
2015	$45,500	$25,300

Figure 5-1. Calculated Cost of Maintaining Stage II as ORVR Penetrates Vehicle Population for Florida Stage II Areas (includes CARB estimate of incompatibility excess emissions)

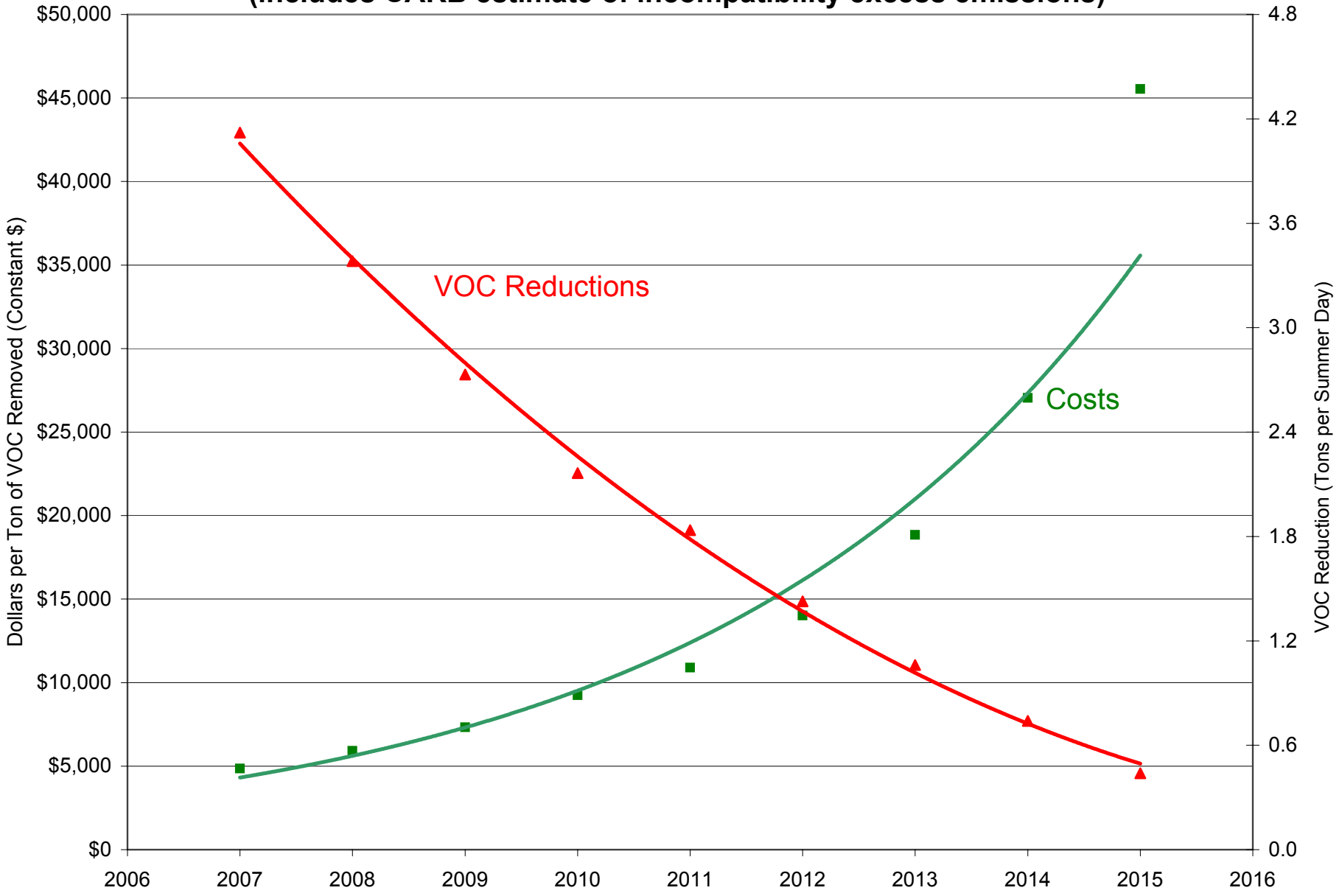
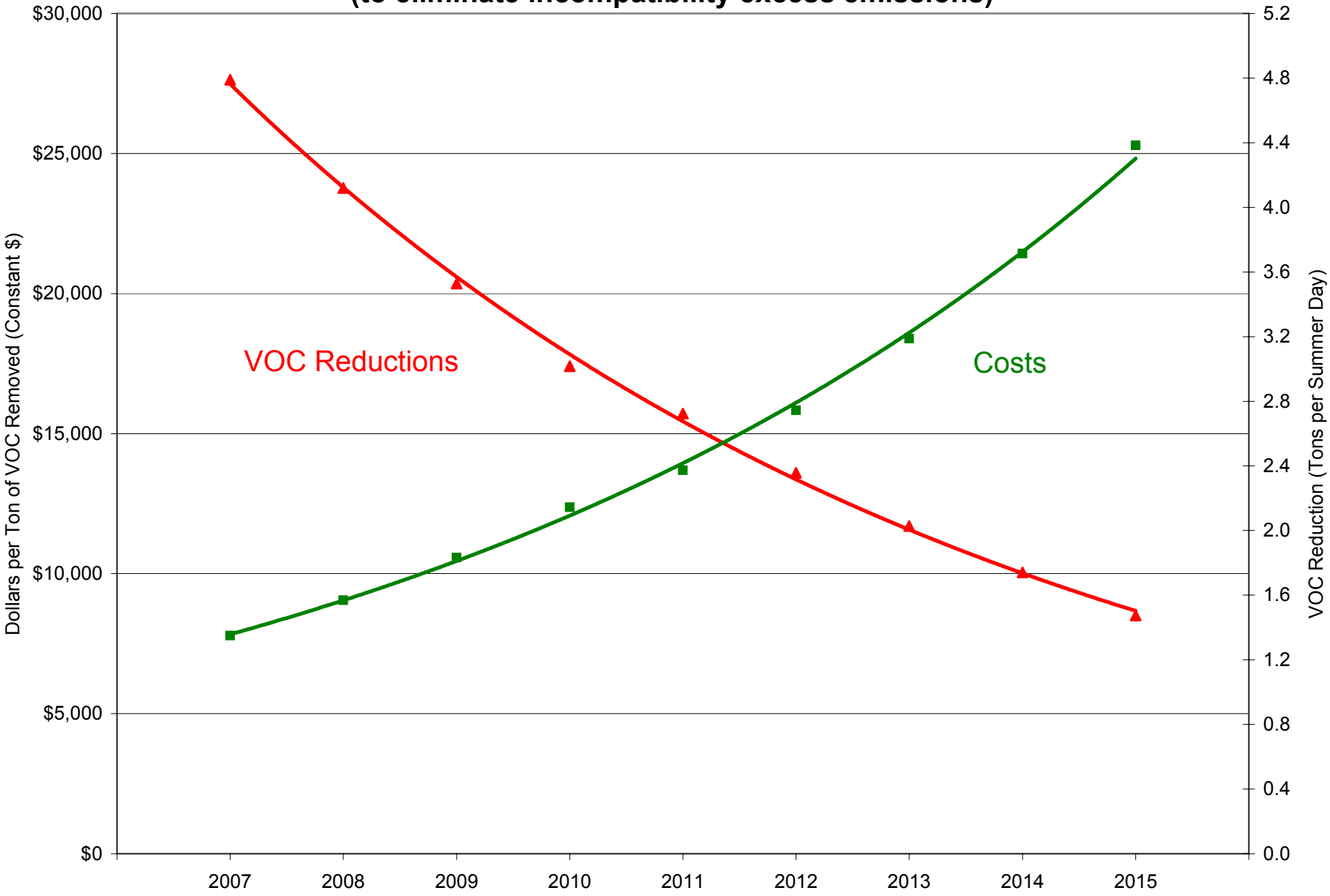


Figure 5-2. Calculated Cost of Eliminating Stage II - ORVR Incompatibility Through Vapor Processor Retrofits for Florida Stage II Areas (to eliminate incompatibility excess emissions)



Graphic Arts White Paper
For the
Processes and Consumer Products Workgroup
September 30, 2005

In response to suggestions offered by the New Jersey Department of Environmental Protection (NJDEP) during development of VOC reduction strategies, the printing industry (represented by the following: Graphic Arts Association, Association of Graphic Communications, Specialty Graphic Imaging Association and Flexographic Technical Association) submits the following White Paper discussion.

Introduction and Background

Included in the suggestions being considered by the NJDEP are three that are directed at graphic arts operations. The suggestions are:

1) Tracking # VOC-009 - This recommendation proposes to increase the current capture and destruction efficiency requirement from 70%, as currently contained in NJAC 7:27-16.7(h), to 90% or 95% for graphic arts sources that currently operate permitted control devices, as well as for those which install capture/control technology. NJDEP claims that industry believes that capture efficiency is already approaching 100%, and that this suggestion would therefore primarily address destruction efficiency.

2) Tracking VOC#010 - This recommendation proposes to change the applicability of NJAC 7:27-16.7(e) from the current threshold of 0.5 gallons per hour and 2.5 gallons per day of material to those sources that use more than 1 gallon of material per day.

3) Tracking #VOC -018 – Emissions Inventory – This recommendation does not focus on control measures but on improved assessments of emissions from all sources in New Jersey.

The printing industry is very concerned about the three suggestions being included in the list of recommendations and strongly urges the NJDEP to not consider acting upon them. The primary objection is due to a lack of data regarding the anticipated emission reductions that could be achieved by these actions and the costs associated with each identified proposal. The printing industry voiced this concern early in the development of the recommendations in a letter dated July 21, 2005 to Mr. Bob Heil, chair of the VOC Air Working Group. The letter (Copy attached) requested additional details and clarification from the NJDEP about the estimates of emission reductions needed from all industry sectors, and specifically, from the printing industry sector.

To date, the Department has not responded to this letter nor in subsequent discussions has been able to clearly identify the approximate emission reductions expected from the

recommendations which will impact the printing industry. The absence of supporting information indicates that the recommendations offered to reduce emissions from the printing industry may have questionable environmental benefit. In addition, they may be prohibitively expensive for industry to implement.

Printing operations were included in the original set of recommendations due to the VOC emissions that have been attributed to area sources. The data used as the basis for these recommendations was based on information from the 2002 emissions inventory. To the best of our knowledge, no efforts were made to work with the printing trade association community prior to these meetings to develop meaningful emission estimates based on more current information.

It is not clear how the NJDEP developed the area source emissions for the printing industry. While the NJDEP did reference AP-42, 5th Edition, this document only contains a single per capita emission factor for the printing industry, which is 0.8 lbs/year/capita. Yet, the NJDEP stated that two emission factors were used and they are contained in Section 4.9.1.2 of AP-42. According to NJDEP's background information the following statement was included:

> *(3) Assumes that 46% of the graphic arts inventory constitutes lithography and letterpress and 54% constitutes rotogravure & flexography as per AP-42 5th Edition Section 4.9.1.2. (4) These categories have two (2) emission factors, both of which are used to calculate a single emission inventory for their respective category.*

After reviewing AP-42 Section 4.9.1.2, only one emission factor, 0.8 lbs/year/capita, could be found. In addition, no supporting information was provided as to why the litho/letterpress printing category was chosen to represent a population of 46% or why the flexo/gravure printing category represents 54%. It is also not apparent why the industry was divided into these two categories as there are other printing processes used in the state. The assumptions the NJDEP chose were incomplete and did not represent the true industrial mix of the printing industry currently operating in New Jersey. It is also important to note that the printing industry has dramatically changed over the past 10 years, and new technologies have been incorporated into many facilities. It is not uncommon for one printing plant to operate several different types of printing presses.

The emission factor being used in the calculations for the entire printing sector by NJDEP is 1.3 lbs/person/year, which is incorrect. The more appropriate factor that should be used for emission estimation purposes should be 0.8 lbs/person/year, as contained in AP-42, 5th edition. Furthermore, the printing industry takes exception to the use of even this old area source emission factor which was simply carried forward from previous editions of AP-42, dating back to the 1970's. Since then, the printing industry has undergone significant changes in technology and input materials. These thirty year old emission factors do not reflect the use of low VOC

materials such as UV inks, alcohol substitutes, and low vapor pressure cleaning solvents, which are widely used technologies in today's printing facility.

We strongly recommend that the NJDEP evaluate the program study funded by the US EPA that focused on the development of an appropriate area source emission factor for the printing industry. In this study, undertaken by the LBJ School of Public Affairs, University of Texas, the 1997 final report concluded that a more appropriate per capita area source emission factor for printing is 0.05 lbs/year/capita. A copy of the study will be provided under separate cover.

In looking at the formulas presented by the NJDEP for the emission factors, another incorrect assumption was made for litho/letterpress operations. It was assumed that the emissions from this source category are not regulated. While the graphic arts rule does not cover either lithographic or letterpress, these types of printing operations are subject to the SOTA requirements found in 7:27-8.12. The imposition of SOTA requirements on these two sectors of the printing industry needs to be taken into account when developing emission estimates.

Prior to any final decisions being made regarding additional VOC regulations, the printing industry strongly urges the NJDEP to reexamine its methodology used for determining the emission estimates from the industry. The NJDEP needs to examine the actual data being reported by printers in the current inventory and to revise its approach for area sources so that the emissions from printing can be accurately reflected.

<u>NJDEP Tracking # VOC-009</u>
This recommendation proposes to increase the current capture and destruction efficiency requirement from 70%, as currently contained in NJAC 7:27-16.7(h), to 90% or 95% for graphic arts sources that currently operate permitted control devices, as well as for those which install capture/control technology. NJDEP claims that industry believes that capture efficiency is already approaching 100%, and that this suggestion would therefore primarily address destruction efficiency. The printing industry disagrees with NJDEP's statement and assumption.

Capture/control technology is highly dependent on the type of manufacturing process and even the type of printing process. In 1997, the graphic arts industry participated in a NJDEP project to write a State of the Art (SOTA) Manual for the graphic arts industry and this was discussed in-depth. Indeed, a representative of one of our associations chaired the workgroup and all associations of signature to this letter and NJDEP officials spent considerable time to produce as comprehensive a document as possible. That manual is still in effect today and continues to reflect state of the art pollution control requirements for the processes identified. Printers installing presses with potential emissions greater than 5 tons per year or more of VOCs must comply with the SOTA requirements found in 7:27-8.12 and the manual provides a viable alternative to conducting a SOTA analysis, which can be very expensive.

Newer presses generally have much better capture efficiency than older presses. If a printer is using older presses, in order to meet these more stringent requirements, they will have to install a permanent total enclosure (PTE). PTEs can be very costly depending on the lay out and size of the facility.

No data has been provided to substantiate the NJDEP's claim that emission reductions would occur if this recommendation was adopted. Based on an initial assessment by the printing industry, these more stringent regulations would only impact a few printing sources operating in the state. According to current industry demographics, many of the printers who would be subject to the proposed requirement are also subject to the Printing and Publishing NESHAP (40 CFR 63.825). This federal standard requires an overall removal efficiency of 95% for organic hazardous air pollutants, which are also VOCs. Therefore, we believe that implementation of this recommendation would produce very few emission reductions from these operations.

Industry has requested information from the NJDEP regarding the number of printing facilities operating capture/control technology; the efficiency ratings of the installed technology, as well as the number of devices installed after 1997, the date the SOTA guide went into effect. Until the NJDEP can identify the number of controlled presses at the 70% level that would be affected and how much additional emission reductions would be achieved, VOC Tracking #09 recommendation cannot be supported. Further, the industry believes that as the older presses are replaced, the SOTA Manual will require these newer, replacement presses to meet a higher level of capture and control. The SOTA Manual was designed to ensure that newer presses are installed that meet the level of highest protection, as identified in the SOTA Manual.

<u>VOC Tracking #010</u>

In this recommendation, the NJDEP proposes to change the applicability of NJAC 7:27-16.7(e) from the current threshold of 0.5 gallons per hour and 2.5 gallons per day of material to those sources that use more than 1 gallon of material per day.

The printing industry fully supports the decision to clearly separate VOC Tracking #010 into two separate recommendations. The first, #010 offers recommendations germane to the surface coating industry, and recommendation #010-A pertains to graphic arts operations. We recommend that the threshold for graphic arts remain unchanged.

While lowering the current threshold does have the potential to increase the number of sources subject to the requirements of NJAC7:27-16.7, the net effect on emissions from printing operations would be minimal as most of these facilities are already subject to the SOTA requirements as a result of compliance with NJAC 7:27-8.12. The SOTA requirements for the graphic arts industry are imposed when the potential VOC emissions for any one source, i.e.,

press, exceeds 5 tons per year. Based on our understanding of the NJDEP definition of coating, this definition includes ink, fountain solutions, if applicable, coatings and cleaning solvents. Since calculation of potential emissions requires that a source assume the worst case scenario, a one gallon per day consumption rate of a material containing 7.5 pounds of VOC, less water and exempt solvent, as applied, would equate to an emission level of 32.85 tons per year.

This level would clearly subject a printing operation to SOTA. If the facility follows the requirements as outlined in the SOTA Manual for graphic arts, then further emission reductions would not be possible. The requirements contained in the SOTA guide are either as stringent, or in some cases more stringent, than what is currently contained in NJAC 7:27-16.7.

The printing industry continues to disagree with the implementation of this VOC tracking recommendation. As discussed above, printing sources are already subject to SOTA requirements. Unless NJDEP can effectively demonstrate that there would be additional emission reductions achieved through implementation of this recommendation, it should not be pursued.

VOC Tracking #013

The workgroup proposed this tracking proposal regarding the emissions inventory system used by the NJDEP.

The printing industry continues to raise the concern regarding assumptions made by the NJDEP in attributing area source emissions to the printing industry, thus identifying the sector as one where reductions can be achieved. As a result, the Processes and Consumer Products Workgroup developed a tracking item related to emissions associated with the printing industry, VOC Tracking #018. This tracking item should be merged with VOC Tracking #013.

Summary and Conclusion

The industry remains convinced that the recommendations offered will not result in any true environmental benefits. The impact of the printing industry is not being correctly represented due to the use of incorrect emission factors by the NJDEP in its calculations. Moreover, the Department is unable to quantify the number of printers impacted, the number of permitted sources, or the costs involved in order to estimate emission reductions from the recommendations.

Before any further emission reductions are proposed for the printing industry, NJDEP needs to take time to determine if these actions are truly necessary. With the adoption of the SOTA Manual for the Printing Industry, facilities bringing in new presses, with potential emissions greater than 5 tons per year, are subject to state of the art control and material usage requirements. We believe that the SOTA Manual provides the necessary emission reductions

from the printing industry resulting in greater environmental protection as desired by the NJDEP.

graphic arts association

1210 Northbrook Drive
Suite 250
Trevose, PA 19053

voice: 215-396-2300
fax: 215-396-9890
email: gaa@gaa1900.com
web: www.gaa1900.com

Arthur L. Salayda, Sr.
Chairman

Margaret Baumhauer
President

July 21, 2005

Mr. Robert Heil
Northern Regional Office
State of New Jersey
Department of Environmental Protection
Bureau of Enforcement Operations
7 Ridgedale Avenue
Cedar Knolls, New Jersey 07927

Reference: NJDEP VOC Air Workgroup and Graphic Arts Industry

Dear Mr. Heil:

The graphic arts industry is delighted to participate in the latest NJDEP Air Workgroups, particularly related to Volatile Organic Compounds (VOCs). The graphic arts industry is represented in New Jersey by several trade associations including, but not limited to the Association of Graphic Communications (AGC), Graphic Arts Association (GAA), Specialty Graphic Imaging Association (SGIA) and the Flexographic Technical Association (FTA). AGC and GAA are the regional affiliates of the national Printing Industries of America/Graphic Arts Technical Foundation (PIA/GATF).

As background, the AGC and GAA represent the printing and publishing industry (SIC 2700) in New Jersey and have over 30 years experience with related environmental issues. The printing and publishing industry is the one of the more significant manufacturing industries in the New Jersey. Even though the industry is large in terms of numbers of establishments, employment, and value of goods shipped, over 80% of printers employ less than 20 employees. Printing is a prime example of small businesses involved in manufacturing.

These associations also have a long history of positive working relationships with NJDEP. As an example, Vicki Keenan from AGC chaired the workgroup that wrote, in conjunction with the other printing industry trade associations, representatives from individual printing and packaging companies, and NJDEP, the NJ State of the Art

The mission of the Graphic Arts Association is to be the leading resource for the printing and graphic communications industry in advocacy, education, and information to enhance the strength and profitability of its members.

Graphic Arts Association est. 1888

(SOTA) manual for printers. This document clearly defines air permit requirements for printers in New Jersey. As another example, Marci Kinter from SGIA was involved in writing the regulations in chapter 7:27-16 related to screen printing. Gary Jones Jones (PIA/GATF) has participated in a number of meetings at NJDEP headquarters with Air Division program policy, technical assistance and enforcement personnel. Michelle Donohue at GAA has attended two meetings of the VOC Workgroup to date, representing the graphic arts industry, and Gary Jones (GATF) has participated in a number of meetings at NJDEP headquarters with Air Division program policy, technical assistance and enforcement personnel.

This historical information is provided to confirm our interest in participating fully in the VOC Workgroup. Likewise, because the recommendations generated by the VOC Workgroup could apply to small, as well as large printers, the impact on printing operations in New Jersey must be critically examined.

At the last meeting, several questions were posed regarding the application of regulations that apply to other industries to the graphic arts or printing industry and the possible lowering of applicability thresholds. However, it was not apparent what type of response is necessary to the questions being raised. It was also not clear as to the context the questions were being posed. In order to fully understand what, if any, response is necessary, further clarification regarding the NJDEP is needed. We would appreciate a written response outlining the questions NJDEP would like the graphic arts industry to discuss, preferably prior to the next VOC workgroup meeting. If you would kindly direct your reply to my attention, I will share it with the other signatores.

Thank you for your consideration, and we look forward to a continued partnership with NJDEP.

Sincerely,

Michelle E Donohue

Michelle E. Donohue, Environmental, Health and Safety Manager
Graphic Arts Association
1210 Northbrook Drive, Suite 250
Trevose, PA 19053
215-396-2300
Email: mdonohue@gaa1900.com

Vicki Keenan, Executive Vice President
Association of Graphic Communications
330 Seventh Avenue, 9th Floor
New York, NY 10001-5010
212-279-2100
Email: spindrvrk@agcomm.org

Marcia Y. Kinter, Vice President-Government Affairs
Screenprinting and Graphic Imaging Association International
703-359-1313
Email: marcik@sgia.org.

Gary A. Jones
Manager, EHS Affairs
Graphic Arts Technical Foundation
412/741-6860
Email: garyjgatf@aol.com

Doreen Monteleone, PhD
Director of Membership & Environmental Services
Flexographic Technical Association
631/737-6020
Email: dmonteleone@flexography.org

October 25, 2005

Mr. Robert Heil
Northern Regional Office
State of New Jersey
Department of Environmental Protection
Bureau of Enforcement Operations
7 Ridgedale Avenue
Cedar Knolls, New Jersey 07927

Reference: Comments on Draft VOC Workgroup Final Report

Dear Mr. Heil:

Thank you for the opportunity to review the draft VOC Workgroup Final Report. As you know, the workgoup has worked hard to review possible new control measures and to ensure that the report reflects the discussions. Overall, the draft report does a good job of summarizing rather complex and technical issues. In reviewing the draft report, there were several areas that require some minor revisions as they pertain to the graphic arts industry.

Attached to this letter is the "redlined" version of the draft report and the comments are summarized below:

1. Not all of the Appendices referenced in the draft final report, were provided. In order to provide a full review and comments, all of the Appendices should be provided to the workgroup for review and comment, especially before it is issued to NJDEP Air Quality Division (Is it Program or Division?).

2. On page 6, Figure 4, we note that emissions from Graphic Arts have not been recalculated using the correct AP-42 emission factor, or the more current emission factor from the EPA funded University of Texas Study. While the comments section on page 20 identified that the emissions factor was discussed, there was no response from NJDEP documented in the report. The graphic arts industry believes this final report needs to reflect NJDEP's intent related to recalculating the emissions and before the

report is issued, the emissions from the graphic arts needs to be revised. If time does not permit for the revision, then the report needs to reflect the commitment to do so along with a timeframe **as to when it will be accomplished**.

3. On page 8, Table 2, we completely agree that tracking proposal VOC-009, Further Control of Graphic Arts Sources, is listed as needing further investigation. It is not clear as to what is meant by "further investigation," and what would constitute the scope of the investigation. Similarly, we ask for clarification of what is meant by "parking lot issues" referenced in the same table. The term is rather informal and in a formal report this term should either be defined or replaced with a description that is more intuitive. If further investigation is necessary, the report should reflect the planned actions along with possible timeframes for the three items identified as VOC-007, VOC-013, VOC 018.

4. On page 20, VOC-018, there were several typographical errors made in this paragraph. The second sentence should be edited to read "1) The representatives stated that the emission factor for graphic arts inventory calculation is in error and that it should be replaced with the correct, AP-42 factor (0.8 lbs/capita/year). 2) The graphic arts industry would prefer the NJDEP use the USEPA funded, LBJ School of Business, University of Texas factor (0.05 lbs/capita/year).The existing Item 2 of the same sentence should be struck entirely as AP-42 does not contain any reference to the industry demographics used by the NJDEP. We refer NJDEP to our White Paper for further discussion of this point.

In Section IX, Comments, on page 20 and 21, the two NJDEP permitting staff comments regarding controls for graphic arts should be struck entirely. The concepts embodied by the comments requires additional discussion prior to there inclusion in the final report. No supporting information was provided to the workgroup to support these comments and it cannot be determined if the comments are based on factual information or opinion.

5. On page, 10 in the Discussion Items Tables, Tracking item VOC-009, we note that none of the pros and cons were changed, which should have been changed, based on the comments and White Paper submitted by the graphic arts industry.

For example, in the Graphic Arts White Paper includes the comment that "no data has been provided to substantiate the NJDEP's claim that emission reductions would occur

if this recommendation was adopted. Based on an initial assessment by the printing industry, these more stringent regulations would only impact a few printing sources operating in the state. The graphic arts *industry has repeatedly requested information from the NJDEP regarding the number of printing facilities operating capture/control technology; the efficiency ratings of the installed technology, as well as the number of devices installed after 1997, the date the SOTA guide went into effect Until the NJDEP can identify the number of controlled presses at the 70% level that would be affected and how much additional emission reductions would be achieved, VOC Tracking #09 recomendation cannot be supported* (from white paper).

6. On page 19, Discussion Items Tables, Tracking item VOC-018, the graphic arts emissions factor used in the 2002 inventory was incorrect and not based on AP-42. As a minimum, emissions for graphic arts should be recalculated using the correct AP-42 factor, or, preferably, the USEPA University of Texas study factor.

Thank you for the opportunity to participate in comments on this draft final report. We respectfully request that our comments be incorporated into the final report before it is submitted to NJDEP Air Quality. We look forward to attending the meeting on November 14, 2005 in Trenton when the final report is presented to NJDEP Air Quality.

Sincerely,

Michelle Donohue, Environmental, Health and Safety Manager
Graphic Arts Association
1210 Northbrook Drive, Suite 250
Trevose, PA 19053
215-396-2300
Email: mdonohue@gaa1900.com

Vicki Keenan, Executive Vice President
Association of Graphic Communications
330 Seventh Avenue, 9th Floor
New York, NY 10001-5010
212-279-2100
Email: spindrvrk@agcomm.org

Marcia Y. Kinter, Vice President-Government Affairs
Screenprinting and Graphic Imaging Association International
703-359-1313
Email: marcik@sgia.org.

Gary A. Jones
Manager, EHS Affairs
Printing Industries of America/Graphic Arts Technical Foundation
412/259-1794
Email: garyjgatf@aol.com

Doreen Monteleone, PhD
Director of Membership & Environmental Services
Flexographic Technical Association
631/737-6020
Email: dmonteleone@flexography.org

ASSOCIATION OF ENVIRONMENTAL AUTHORITIES
2333 Whitehorse-Mercerville Road ▲ Suite 3 ▲ Mercerville ▲ NJ 08619-1946
(609) 584-1877 ▲ Fax: (609) 584-8271 ▲ E-mail: info@aeanj.org ▲ Website: www.aeanj.org

September 29, 2005

Robert Heil
Division of Air Quality
NJDEP
PO Box 027
401 East State Street
Trenton, NJ 08625-027

Re: Comments on Voc emissions from publicly owned treatment facilities

Dear Mr. Heil:

We understand that the sub group on VOCs has been discussing whether to include publicly owned treatment plants (POTWs) in the list of potential areas for additional VOC reduction. Based on the available literature and an informal survey of our members, it appears that the vast majority of POTWs are not significant sources of VOCs.

EPA reviewed comments on whether to regulate all potws in 2002 and determined that:

> "Compliance with such requirements is impracticable, infeasible, or unnecessarily burdensome on such categories." (*Fed Register/Vol.67, no. 56. Friday, March 22, 2002/proposed rules*)

They reasoned that since the composition of an industrial discharge is already determined in the indirect discharge permits and that industries already have air emission permits, that further regulation of the POTWs as a general group was unnecessary.

Current, Delegated Local Agencies (DLAs) with industrial pretreatment programs are required by NJAC 7:14A-19.3 et seq to perform priority pollutant scans of the POTW's influent and effluent which identifies chemicals that might potentially volatilize. In addition, NJAC 7:27-8 et sec and NJAC 7:27-22 et seq already have in place numerical influent VOC concentration limits which trigger air permit applicability for wastewater treatment equipment.

Emission Levels/ Technical Considerations

There are no viable methods for measuring actual VOC emissions from wastewater treatment processes. Various methods have been tried and found to be overly complex, difficult and very costly. Most estimates of emission levels are based on either very conservative mass balances, derivation of emission factors, or modeling results. Some of the more common models used are WATER 7/8/9, BASTE, and TOXCHEM.

In preparation for this response the AEA surveyed its members to obtain VOC emission level data from various sized facilities. The vast majority of our 108 members do not have any data because they fall well below the 10-tons/year emission statement reporting level.

We did receive estimates of VOC data for 14 POTWs. Some of the facilities had performed modeling, the others did mass balances. Generally the modeling results indicate lower numbers than the mass balances. It is believed that the mass balance data is overly conservative and overstates the actual VOC emissions.

The treatment plant capacities of the respondents ranged from 3mgd to approximately 90 mgd. Most were either medium or large sized plants All of the emission levels except for one of the largest facilities were less than 6.5 tons/year. The estimated average emission level of these 13 facilities (excluding the one large facility with industrial flow contribution) was approximately 2.5 tons/year. If data were available for all of the other small and mid sized facilities, it is clear that the average VOC emission rate would be much less, most likely, below 1 ton/year per facility.

We were told that the suggestion to include POTWs was based on experiences with a refinery wastewater facility. However, the components in the refinery influent are entirely different and include much higher levels of VOCs than those from the domestic and commercial sewage found in POTWs.

As you know much of New Jersey's manufacturing industry has left the state. In areas where there is significant industry, industrial pretreatment programs have been very successful in significantly reducing pollutant levels flowing into the POTWs. Over the last 20 years we have seen a consistent lowering of industrial pollutants in the treatment plant influents and in the sludge these POTWs produce. This is positive evidence of the significant difference between industrial wastewater facilities and POTWs.

Economic considerations

Although there are some common elements between POTWs, there are significant differences in the available wastewater treatment processes and their layout. Therefore the costs to capture and control the VOCs will differ widely from one plant to another. However, it is clear that the costs will be substantial for the relatively small amount of VOCs being removed.

In order to control VOCs at a POTW, they must first be contained, then conveyed to a treatment unit and finally treated. Many of the tanks at most treatment plants are not covered. Because of the size of these tanks they will be very expensive to cover. The conveyance and treatment facilities will also be expensive because of the relatively large volumes of air, which must be treated.

Although we are not aware of any New Jersey POTWs, which have installed a VOC reduction facility, we can give an example of costs on a recently constructed facility. At a medium sized POTW, a recent odor control project included the covering of aeration tanks, and construction of ducts, fans, odor control building and biofilters. The facility did not have primary clarifiers to

cover and the aerated grit chamber was covered under a previous project. The cost of the project was $2,000,000. If it was a typical facility with primary clarifiers and if the cost of covering the aerated grit chamber is included, the project would have cost approximately $3,000,000. These costs could increase due to the number of tanks, location issues and coordination with other design concerns.

The facility mentioned above has estimated its VOC emissions at approximately 2.5 tons/year using a very conservative mass balance. If we capitalize the $3,000,000 construction cost ($300,000/year) and add an O&M cost of $60,000(2%), we have an annual cost of $360,000.

If we assume that the biofilters will remove 70% of the VOCs (1.75 tons/year), the VOC reduction cost is approximately $206,000/ton of VOC removed. This is not very cost effective.

This cost will be borne by the ratepayers and citizens of New Jersey so it is especially important to be sure that significant reduction in voc emissions will be achieved by the billions of dollars that will be spent statewide.

Since USEPA has already investigated this option thoroughly I would hope that NJ would not propose that all potws control vocs. The cost benefit analysis was a key factor and one, which we should all respect. Certainly, NJ would need to do a thorough economic analysis before proposing regulations.

I have attached several documents that support the statements in this letter. Please contact me if you have further questions.

Sincerely,

Ellen Gulbinsky
Executive Director

Inc. See attached resource list.

Resources related to Voc emissions from POTWs
September 29, 2005
Association of Environmental Authorities

National Emission Standards for hazardous Air Pollutants (NESHAP): Publicly Owned Treatment Works: Background Information for Final Standards: Summary of Public Comments and Responses
Contains a summary of all the public comments made on the proposed standards and the Administrator's responses to the comments and a summary.
http://www.epa.gov/ttn/oarpg/t3/reports/bidpotw.pdf

It's a 59 page document, but I think the answers are on page 52: 16.0 SOLICITATION OF COMMENTS
Excerpt provided

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 63
[AD–FRL–7161–6]
RIN 2060–AJ87
National Emission Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works
AGENCY: Environmental Protection Agency (EPA).
ACTION: Proposed amendments.

http://www.epa.gov/reg3wapd/pretreatment/pdfs_txt/neshap.pdf

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 63
[FRL–7394–7]
RIN 2060–AJ66
National Emission Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works; Final Rule
AGENCY: Environmental Protection Agency (EPA).
ACTION: Final rule, amendments.

http://www.epa.gov/ttncaaa1/t3/fr_notices/potw_atfra.pdf
copy provided

[PDF] Washington State Air Toxic Sources and **Emission** Estimation **Methods**
File Format: PDF/Adobe Acrobat - View as HTML
Municipal Wastewater Treatment. Air Toxics **Emissions** Estimation **Methods ...**
equipment leaks, and **VOC emissions** from petroleum refinery **wastewater** systems. **...**
www.ecy.wa.gov/pubs/98207.pdf - Similar pages

Excerpt provided.

VOC Emissions From Wastewater Treatment Plants: Characterization, Control, and Compliance

Edited by Prakasam Tata, Jay Witherspoon, and Cecil Lue-Hing

Although primarily concerned with the treatment of wastewater and drinking water, publicly owned treatment works are required to be in compliance with the Clean Air Act and a series of amendments to the act to control emissions of odors, criteria pollutants, and volatile organic compounds (VOCs). This book helps provide the tools, concepts, policies, and information required to develop an air quality compliance plan and to assess the labor and capital requirements to maintain the plan's viability.

With contributions from a panel of experts, the book reflects many viewpoints and approaches based on various quality compliance and assessment conditions and experiences. This body of knowledge can be used to develop a clear picture of how to design, set up, and maintain a successful air quality compliance program. Included in the book are the following chapters:

- US Air Quality Regulations
- Occurrence of VOCs in Wastewater
- Source Characterization and VOCs of Importance
- Unit Processes and Emissions: An Overview
- VOC Emissions From Sewers
- VOC Emissions From Preliminary and Primary Treatment
- VOC Emissions From Dissolved Air Flotation
- VOC Emissions From Biological Treatment Systems: Activated Sludge Process
- VOC Emissions From Fixed Film Processes
- VOC Emissions From Biosolids' Dewatering Processes
- Sampling and Analytical Methods for Hazardous Air Pollutants
- VOC Emission Estimation Methods
- VOC Emissions From Wastewater Treatment Facilities
- Control Technologies
- Control Technology Evaluation

Available from CRC Press LLC, Attn: Order Entry, 2000 NW Corporate Blvd., Boca Raton, FL 33431-9868; (800) 272-7737 or (561) 994-0555 outside North America; fax (800) 374-

3401 or (561) 989-8732 outside North America; website http://www.crcpress.com, e-mail orders@crcpress.com. ISBN 1566768209. (2003, hardcover, 432 pp., $149.95)